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(54) **PORTABLE COMPUTING INPUT DEVICES AND METHODS**

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G06F 3/023	(2006.01)
G06F 3/02	(2006.01)
G06F 40/166	(2006.01)

(52) **U.S. Cl.**

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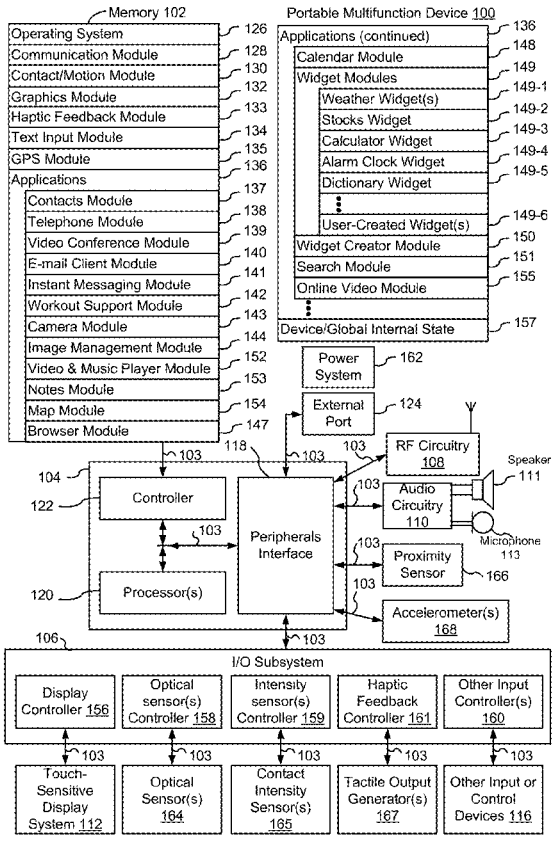
(57) **ABSTRACT**

The present disclosure provides a method for mirrored control between devices performed at a first electronic device including one or more processors, memory, and a touch-sensitive display. The method includes: sending an item from a first instant messenger application running on the first electronic device to a second instant messenger application running on a second electronic device; displaying the item in the first instant messenger application, wherein the item is concurrently displayed in the second instant messenger application; receiving information corresponding to an interaction with the item; and in response to receiving information corresponding to the interaction, updating the item on the first electronic device, wherein the update to the item is mirrored on the second electronic device.



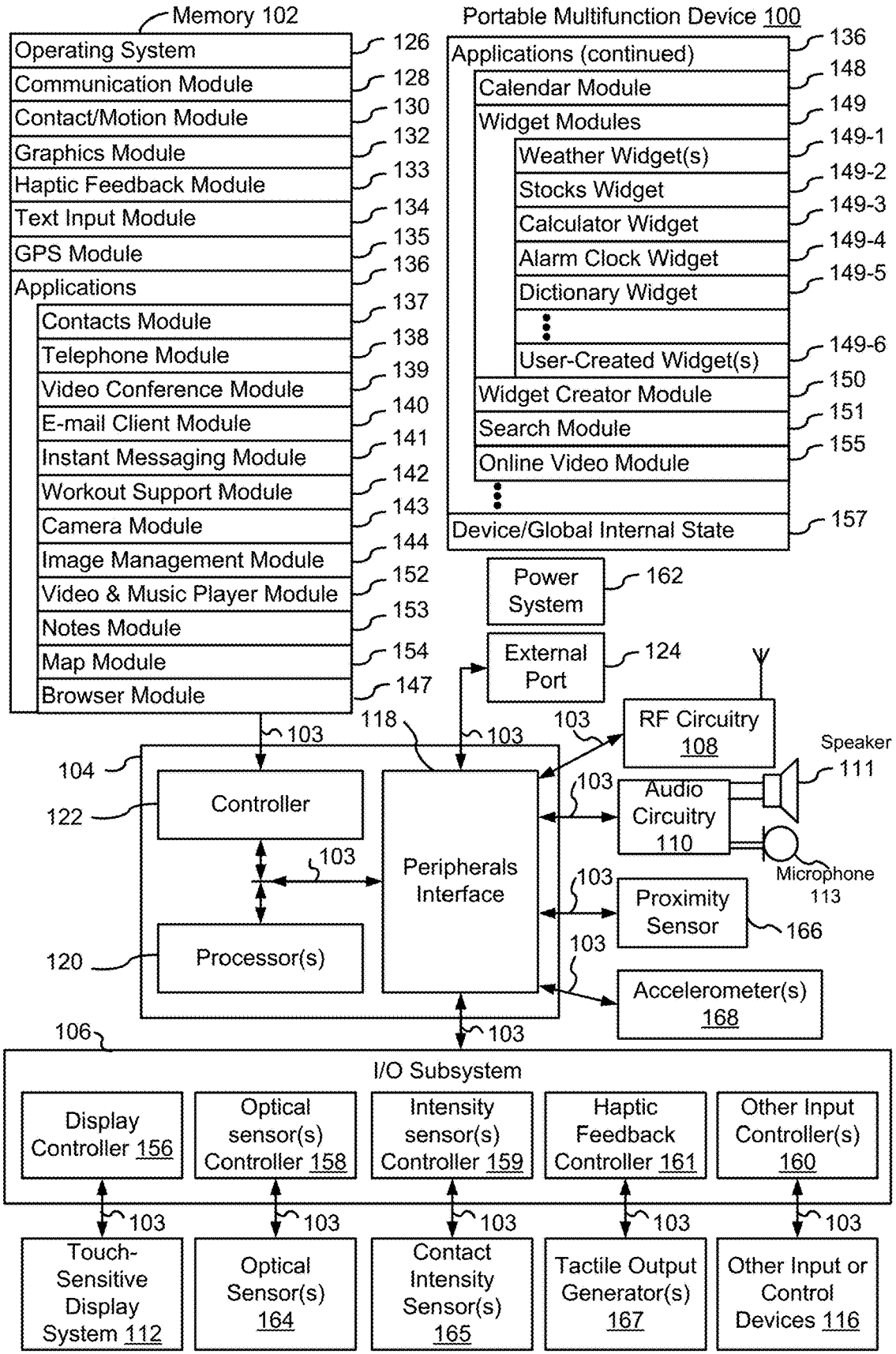

Memory 102
Operating System
126
Communication Module
128
Contact/Motion Module
130
Graphics Module
132
Haptic Feedback Module
133
Text Input Module
134
GPS Module
135
Applications
136
Contacts Module
137
Telephone Module
138
Video Conference Module
139
E-mail Client Module
140
Instant Messaging Module
141
Workout Support Module
142
Camera Module
143
Image Management Module
144
Video & Music Player Module
152
Notes Module
153
Map Module
154
Browser Module
147
Portable Multifunction Device 100
Applications (continued)
136
Calendar Module
148
Widget Modules
149
Weather Widget(s)
149-1
Stocks Widget
149-2
Calculator Widget
149-3
Alarm Clock Widget
149-4
Dictionary Widget
149-5
User-Created Widget(s)
149-6
Widget Creator Module
150
Search Module
151
Online Video Module
155
Device/Global Internal State
157
Power System
162
External Port
124
RF Circuitry 108
Speaker 111
Audio Circuitry 110
Microphone 113
Proximity Sensor
166
Accelerometer(s) 168
Peripherals Interface
Controller
Processor(s)
104
122
120
118
103
106
I/O Subsystem
Display Controller 156
Optical sensor(s) Controller 158
Intensity sensor(s) Controller 159
Haptic Feedback Controller 161
Other Input Controller(s) 160
Touch-Sensitive Display System 112
Optical Sensor(s) 164
Contact Intensity Sensor(s) 165
Tactile Output Generator(s) 167
Other Input or Control Devices 116

Figure 1A

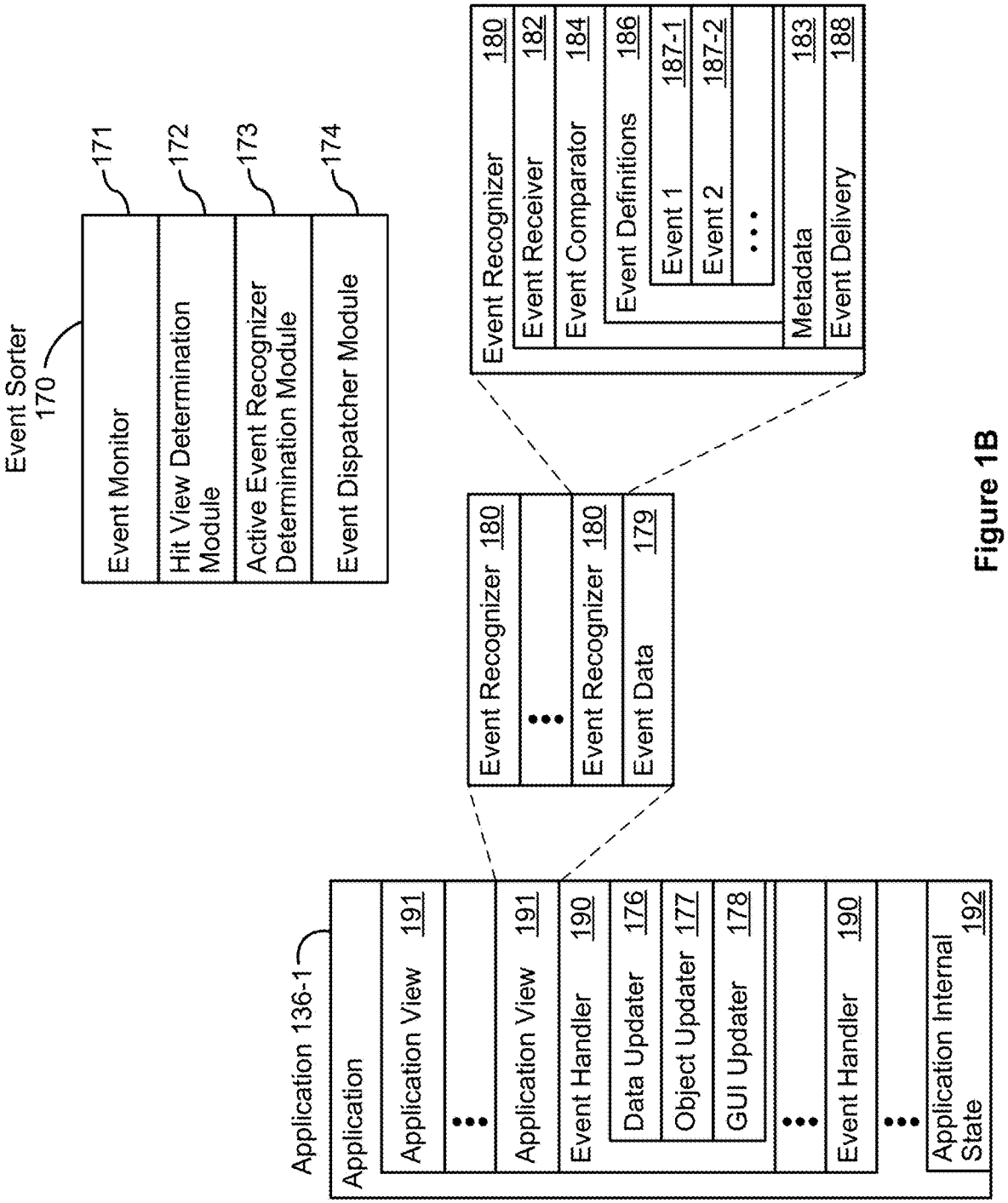

Event Sorter
170
Event Monitor
171
Hit View Determination Module
172
Active Event Recognizer Determination Module
173
Event Dispatcher Module
174
Application 136-1
Application
Application View 191
Application View 191
Event Handler 190
Data Updater 176
Object Updater 177
GUI Updater 178
Event Handler 190
Application Internal State 192
Event Recognizer 180
Event Recognizer 180
Event Data 179
Event Recognizer 180
Event Receiver 182
Event Comparator 184
Event Definitions 186
Event 1 187-1
Event 2 187-2
Metadata 183
Event Delivery 188

Figure 1B

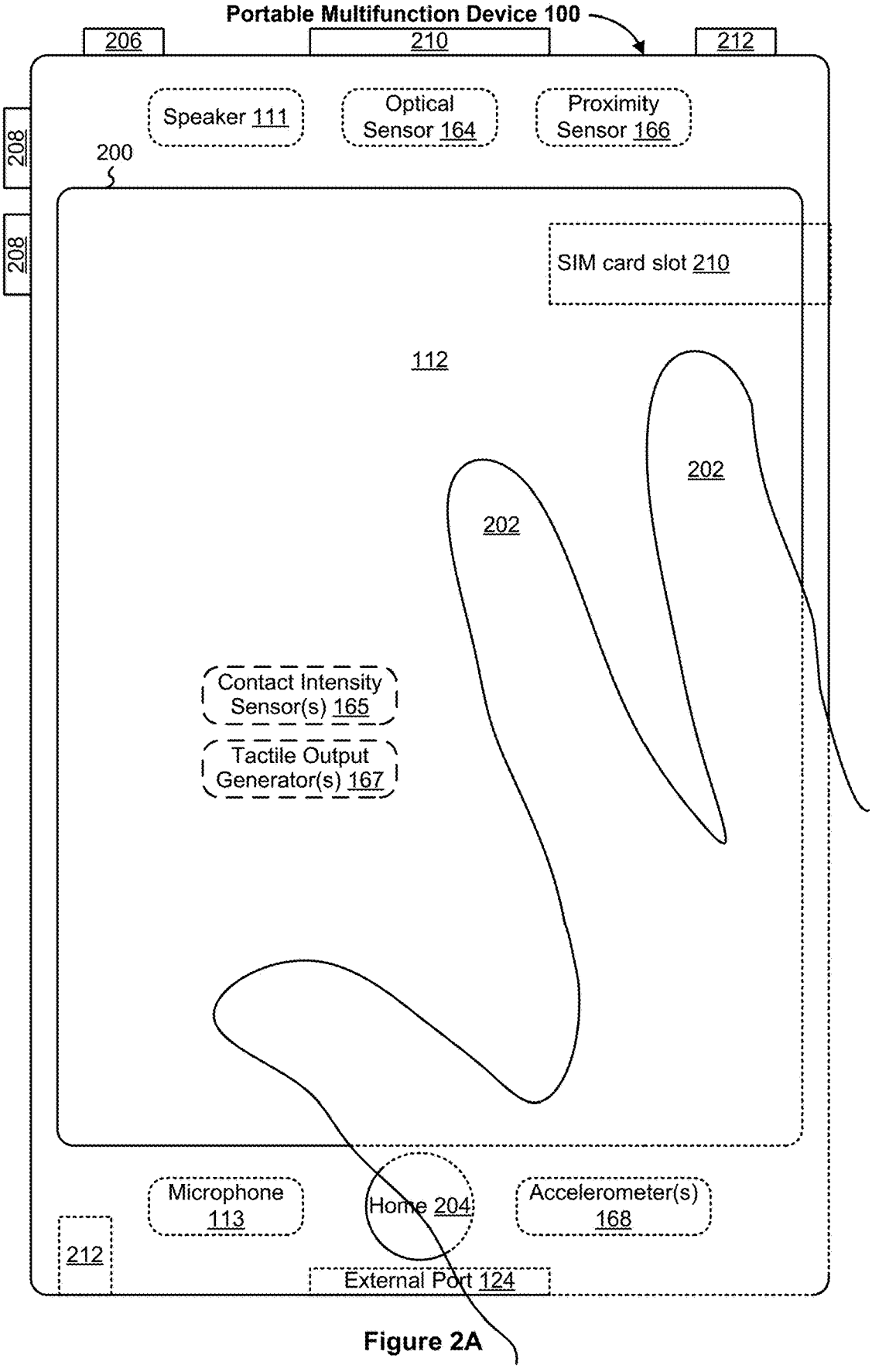
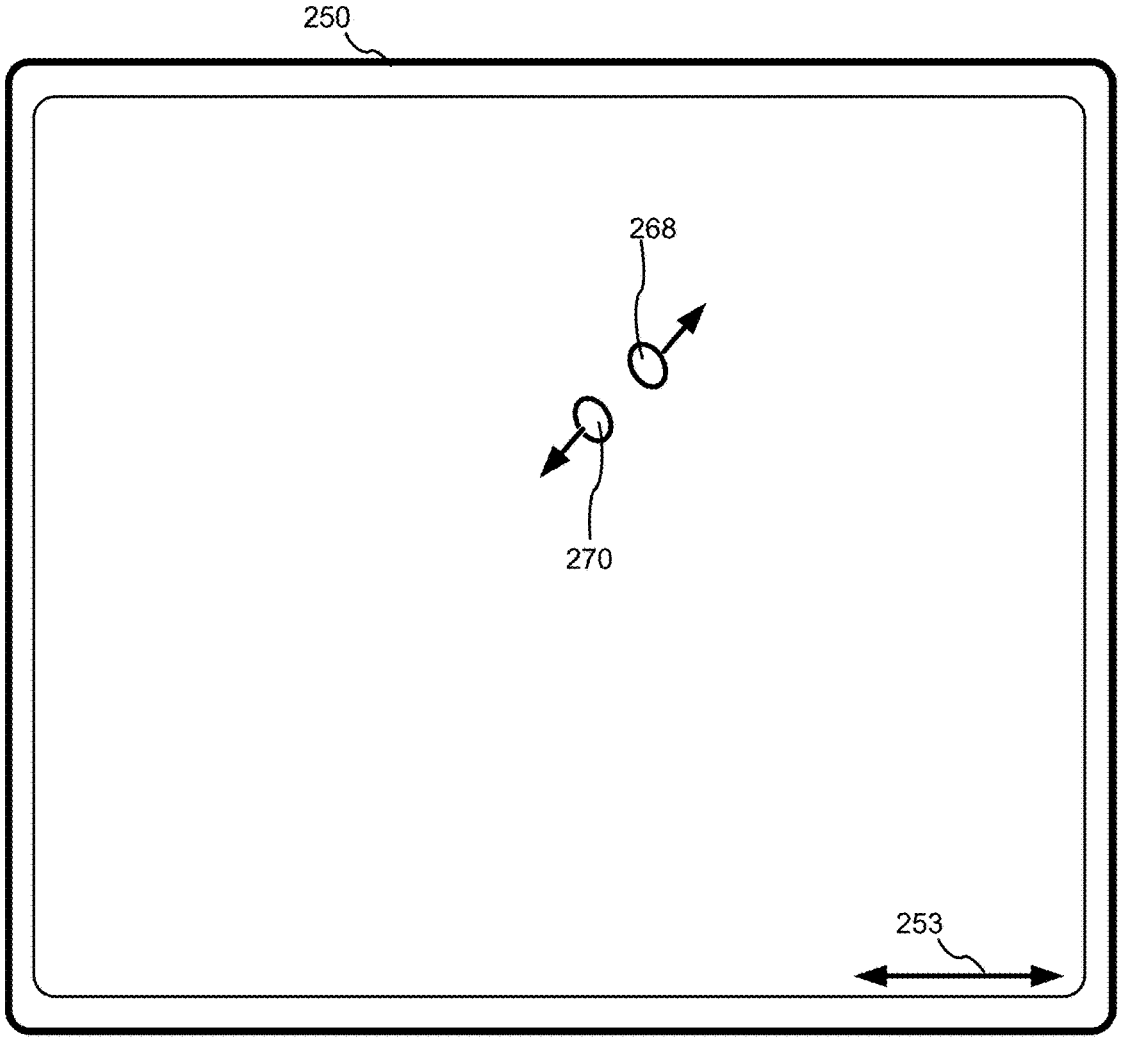

Portable Multifunction Device 100
206
210
212
Speaker 111
Optical Sensor 164
Proximity Sensor 166
208
208
200
SIM card slot 210
112
202
202
Contact Intensity Sensor(s) 165
Tactile Output Generator(s) 167
Microphone 113
Home 204
Accelerometer(s) 168
212
External Port 124

Figure 2A


250
268
270
253

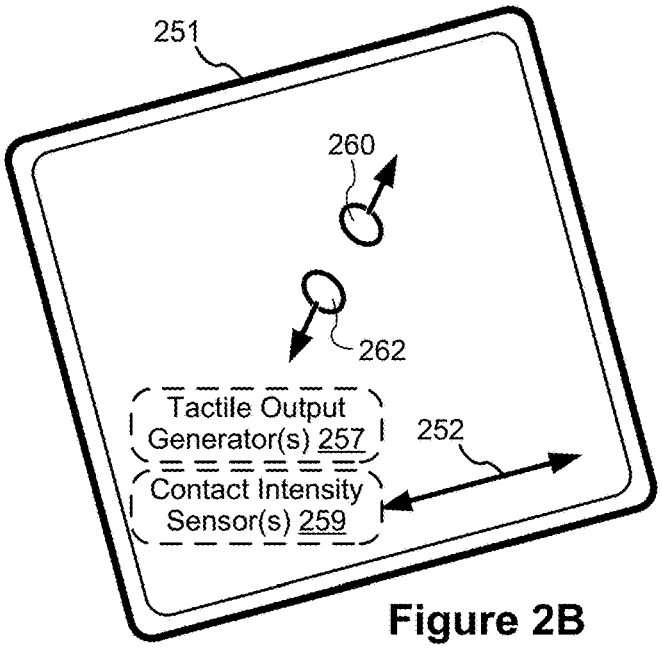

251
260
262
Tactile Output Generator(s) 257
Contact Intensity Sensor(s) 259
252

Figure 2B

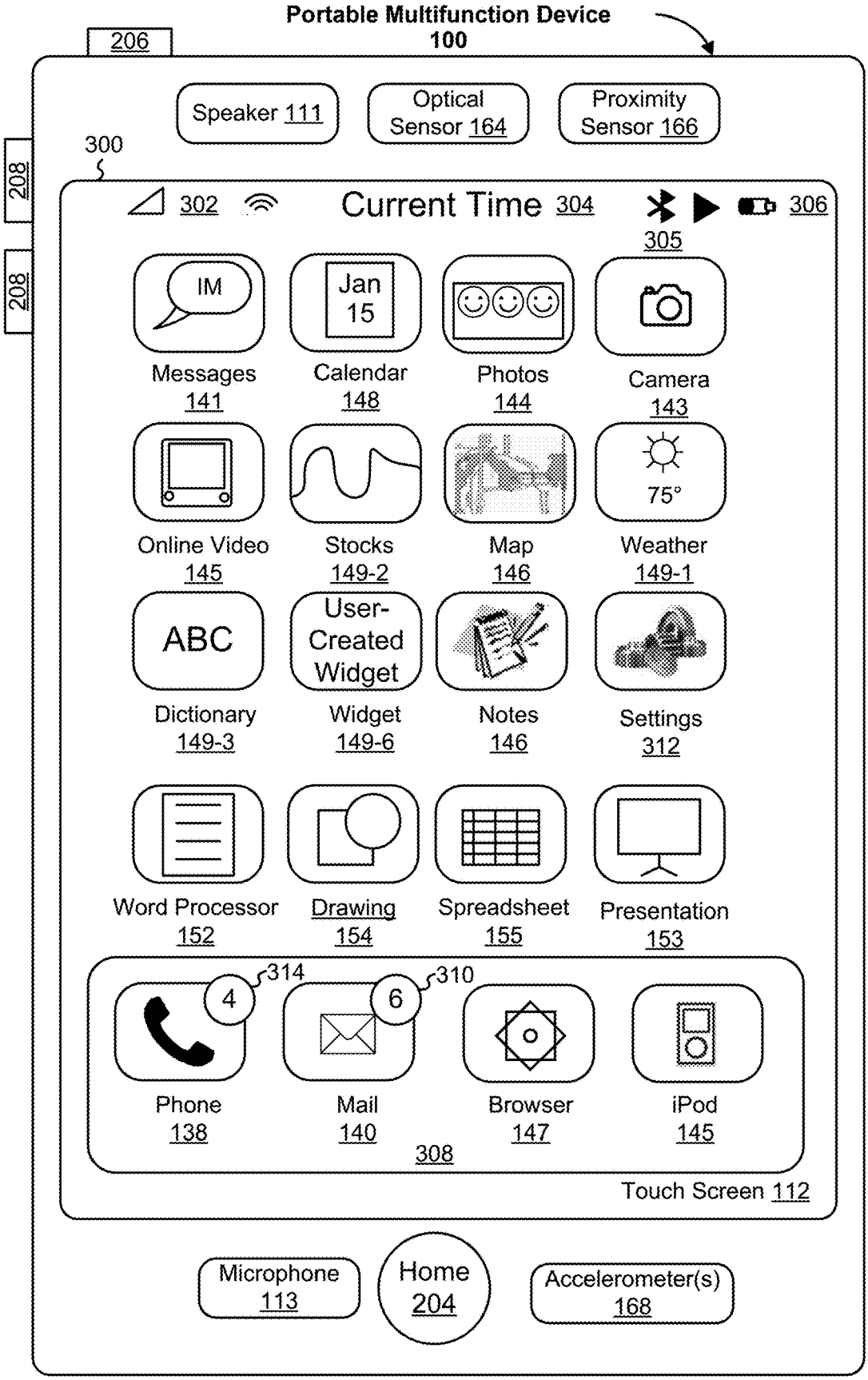

Portable Multifunction Device
100
206
Speaker 111
Optical Sensor 164
Proximity Sensor 166
300
208
208
302
Current Time 304
306
305
IM
Messages 141
Jan 15
Calendar 148
Photos 144
Camera 143
Online Video 145
Stocks 149-2
Map 146
75°
Weather 149-1
ABC
Dictionary 149-3
User-Created Widget
Widget 149-6
Notes 146
Settings 312
Word Processor 152
Drawing 154
Spreadsheet 155
Presentation 153
314
4
310
6
Phone 138
Mail 140
Browser 147
iPod 145
308
Touch Screen 112
Microphone 113
Home 204
Accelerometer(s) 168

Figure 3A

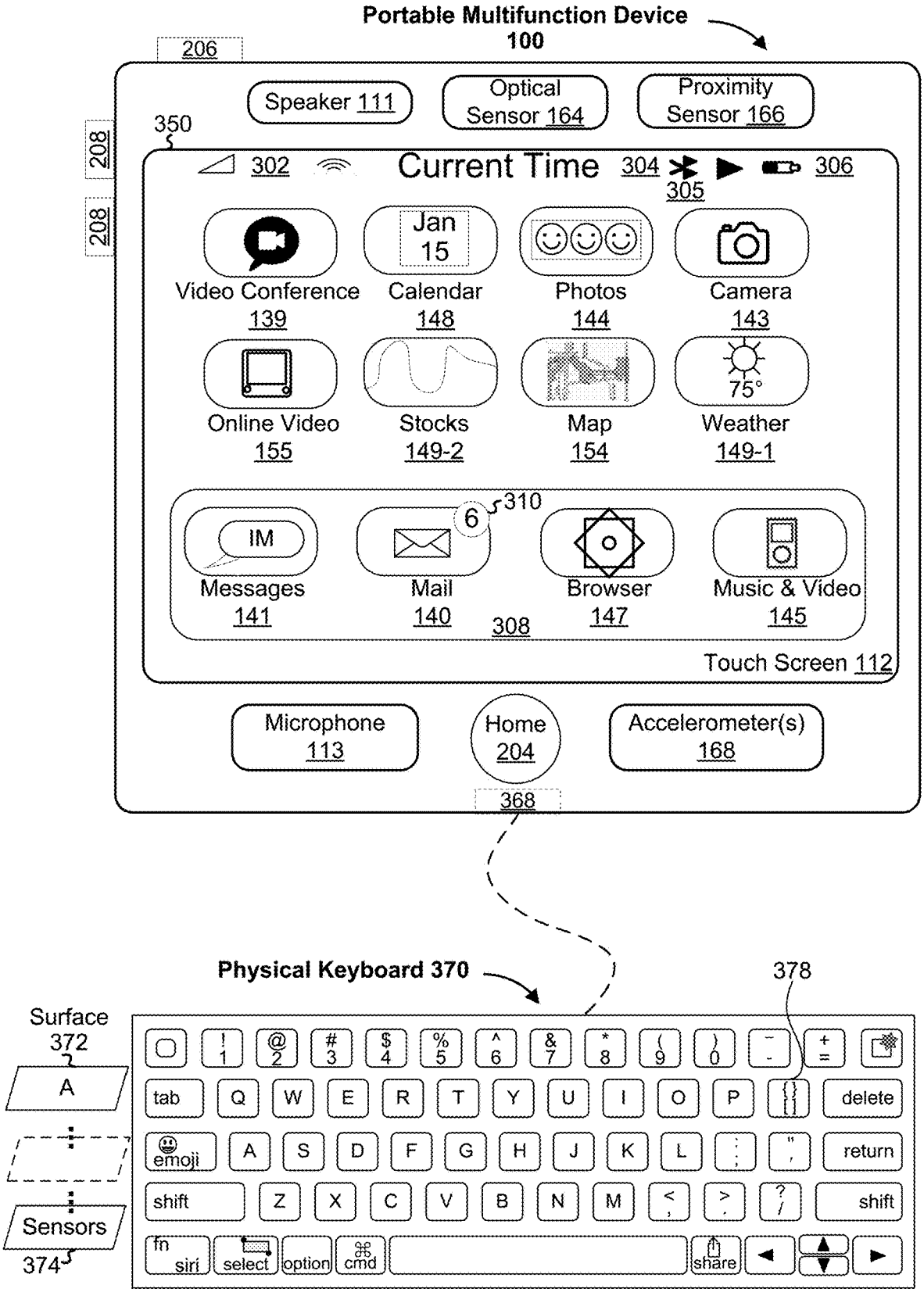

Portable Multifunction Device
100
206
Speaker 111
Optical Sensor 164
Proximity Sensor 166
350
208
208
302
Current Time
304
305
306
Video Conference
139
Jan
15
Calendar
148
Photos
144
Camera
143
Online Video
155
Stocks
149-2
Map
154
75°
Weather
149-1
310
6
IM
Messages
141
Mail
140
Browser
147
Music & Video
145
308
Touch Screen 112
Microphone
113
Home
204
Accelerometer(s)
168
368
Physical Keyboard 370
378
Surface
372
A
Sensors
374
tab
Q W E R T Y U I O P
delete
emoji
A S D F G H J K L
return
shift
Z X C V B N M
shift
fn
siri
select
option
cmd
share

Figure 3B

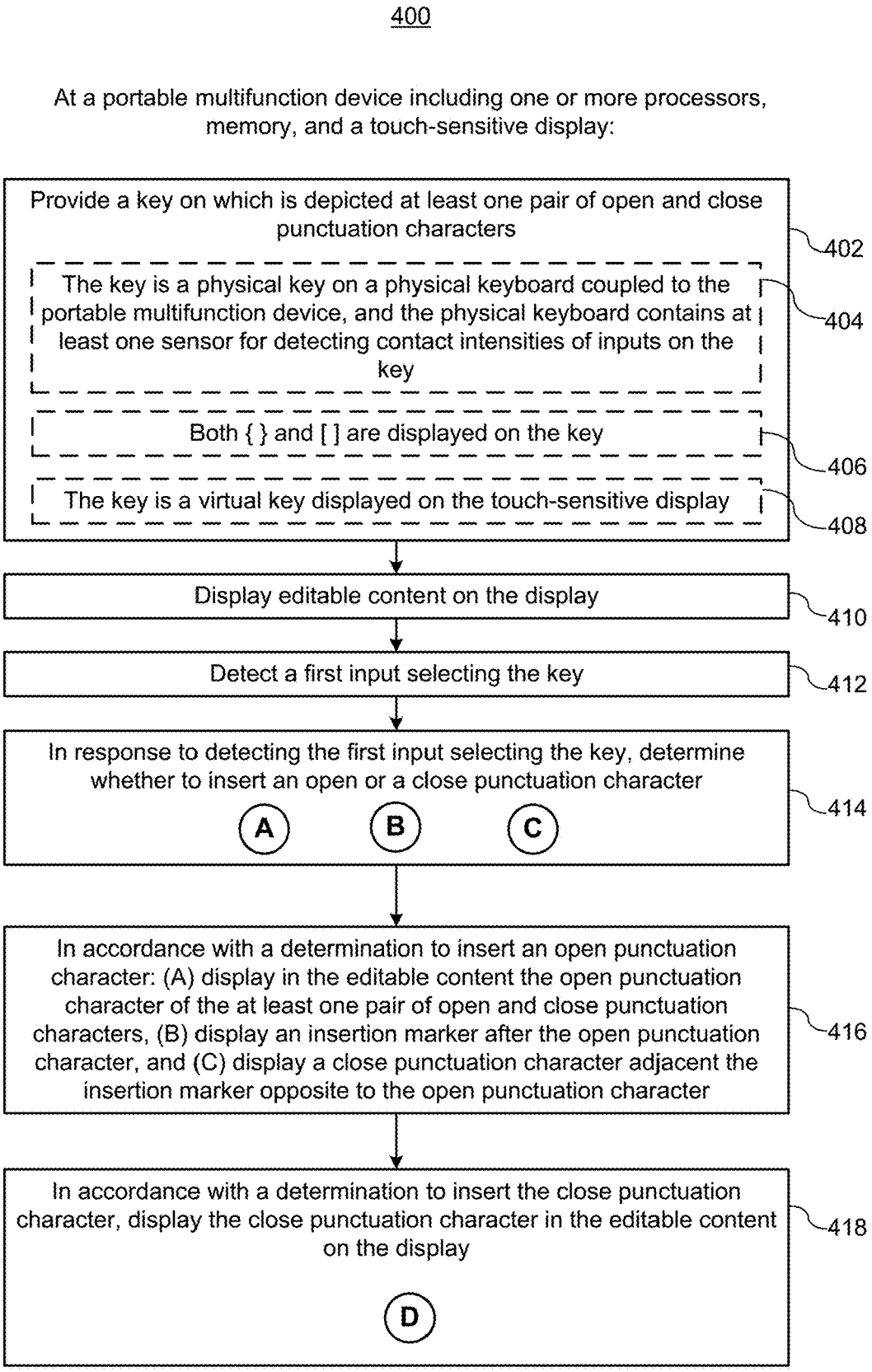

400
At a portable multifunction device including one or more processors, memory, and a touch-sensitive display:
Provide a key on which is depicted at least one pair of open and close punctuation characters
402
The key is a physical key on a physical keyboard coupled to the portable multifunction device, and the physical keyboard contains at least one sensor for detecting contact intensities of inputs on the key
404
Both { } and [ ] are displayed on the key
406
The key is a virtual key displayed on the touch-sensitive display
408
Display editable content on the display
410
Detect a first input selecting the key
412
In response to detecting the first input selecting the key, determine whether to insert an open or a close punctuation character
A
B
C
414
In accordance with a determination to insert an open punctuation character: (A) display in the editable content the open punctuation character of the at least one pair of open and close punctuation characters, (B) display an insertion marker after the open punctuation character, and (C) display a close punctuation character adjacent the insertion marker opposite to the open punctuation character
416
In accordance with a determination to insert the close punctuation character, display the close punctuation character in the editable content on the display
418
D

Figure 4A

400

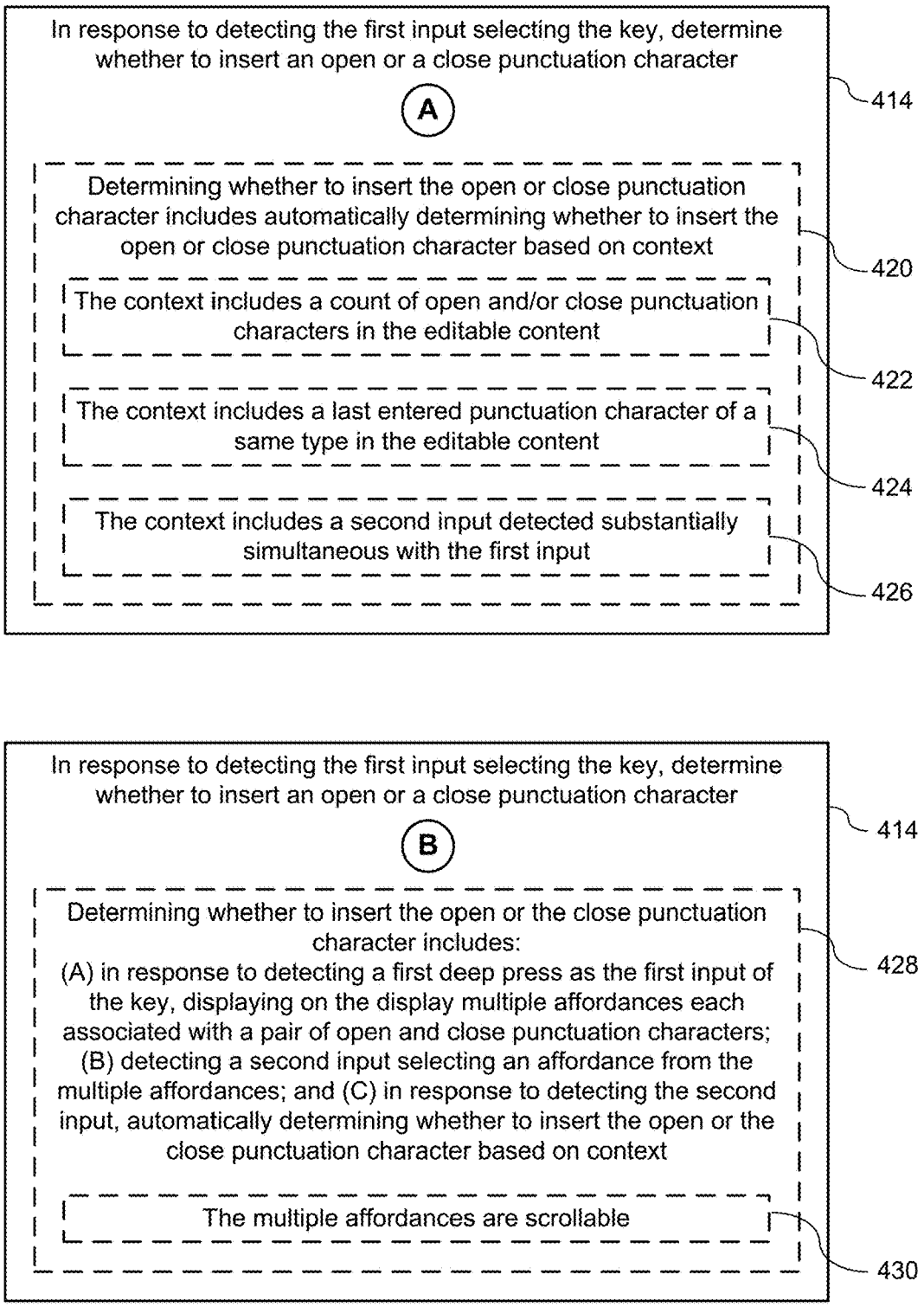


Figure 4B

400

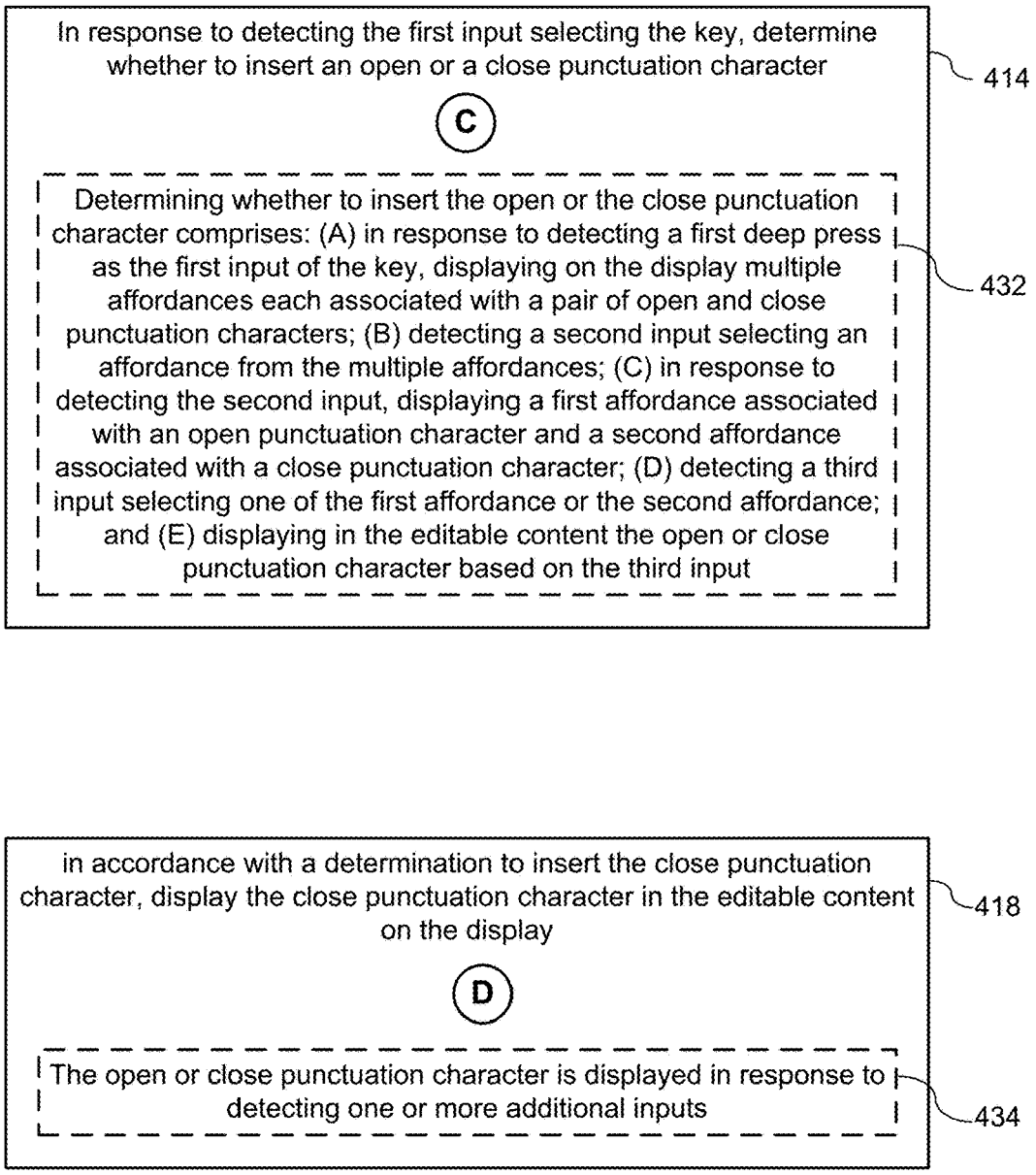


Figure 4C

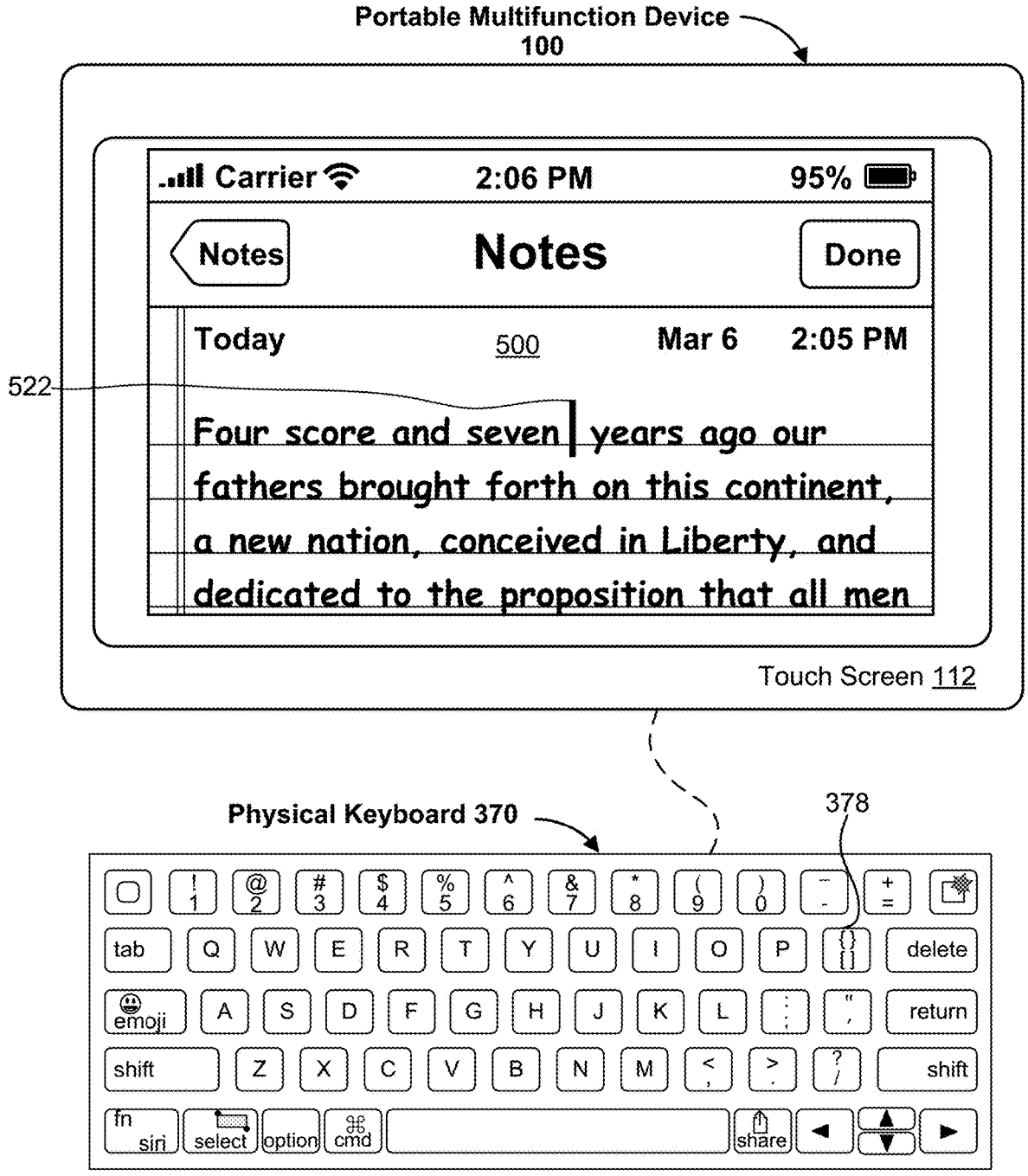

Portable Multifunction Device
100
Carrier
2:06 PM
95%
Notes
Notes
Done
Today
500
Mar 6
2:05 PM
522
Four score and seven years ago our fathers brought forth on this continent, a new nation, conceived in Liberty, and dedicated to the proposition that all men
Touch Screen 112
Physical Keyboard 370
378
tab
delete
emoji
return
shift
shift
fn
siri
select
option
cmd
share

Figure 5A

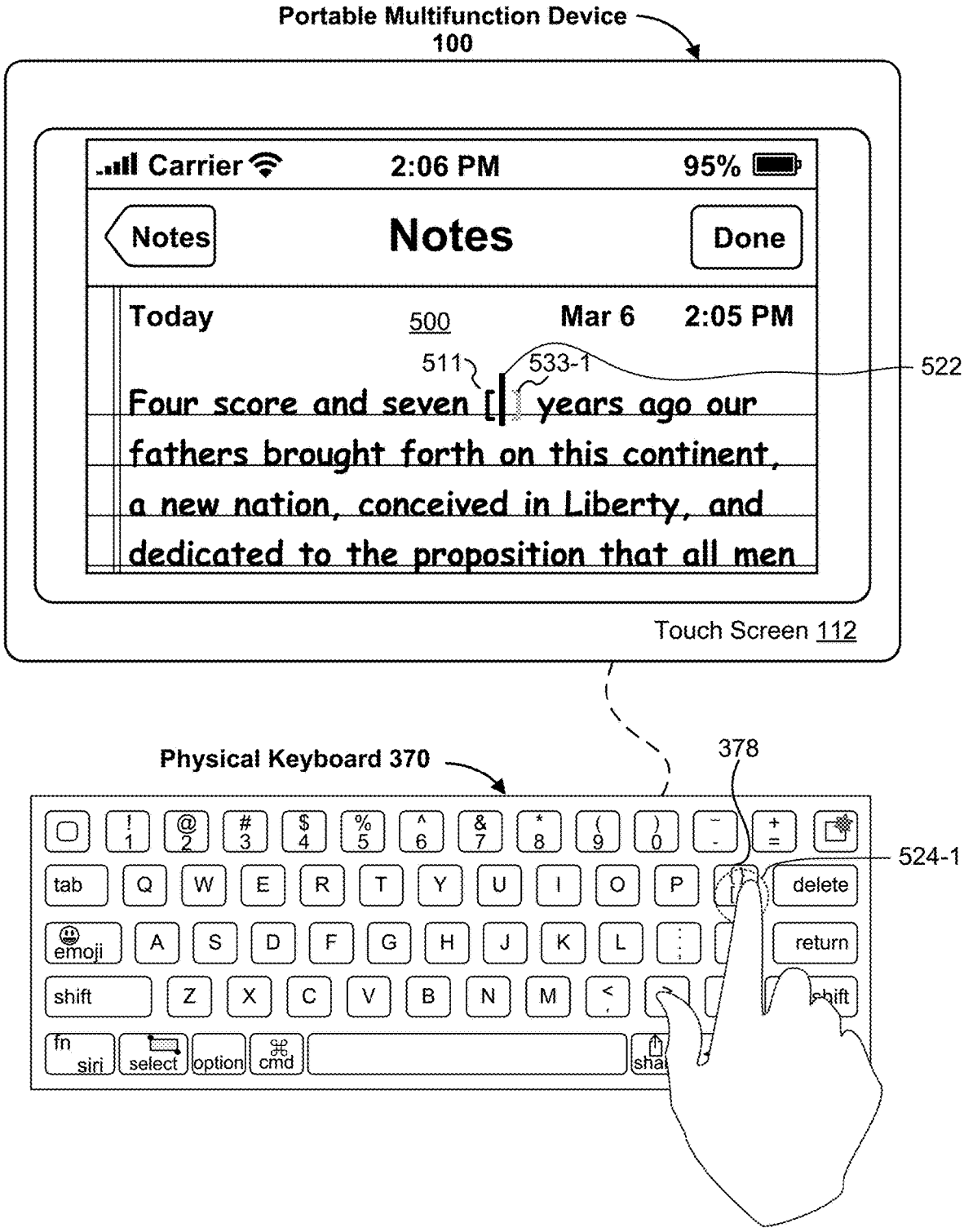

Portable Multifunction Device
100
Carrier
2:06 PM
95%
Notes
Notes
Done
Today
500
Mar 6
2:05 PM
511
533-1
522
Four score and seven [years ago our fathers brought forth on this continent, a new nation, conceived in Liberty, and dedicated to the proposition that all men
Touch Screen 112
Physical Keyboard 370
378
524-1
tab
delete
return
shift
fn
siri
select
option
cmd

Figure 5B

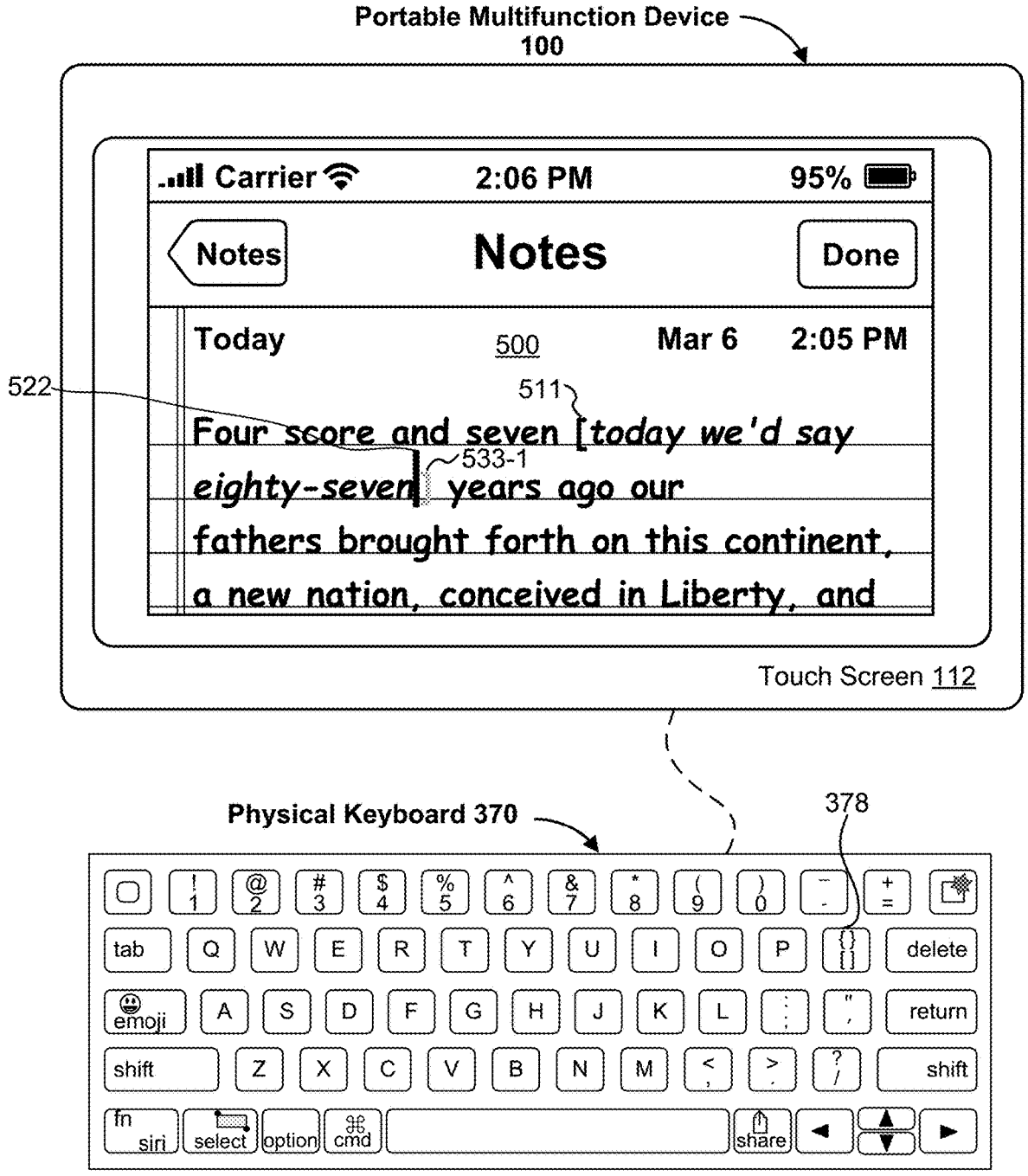

Portable Multifunction Device
100
Carrier
2:06 PM
95%
Notes
Notes
Done
Today
500
Mar 6
2:05 PM
522
511
Four score and seven [today we'd say
533-1
eighty-seven years ago our
fathers brought forth on this continent,
a new nation, conceived in Liberty, and
Touch Screen 112
Physical Keyboard 370
378
tab
delete
emoji
return
shift
shift
fn
siri
select
option
cmd
share

Figure 5C

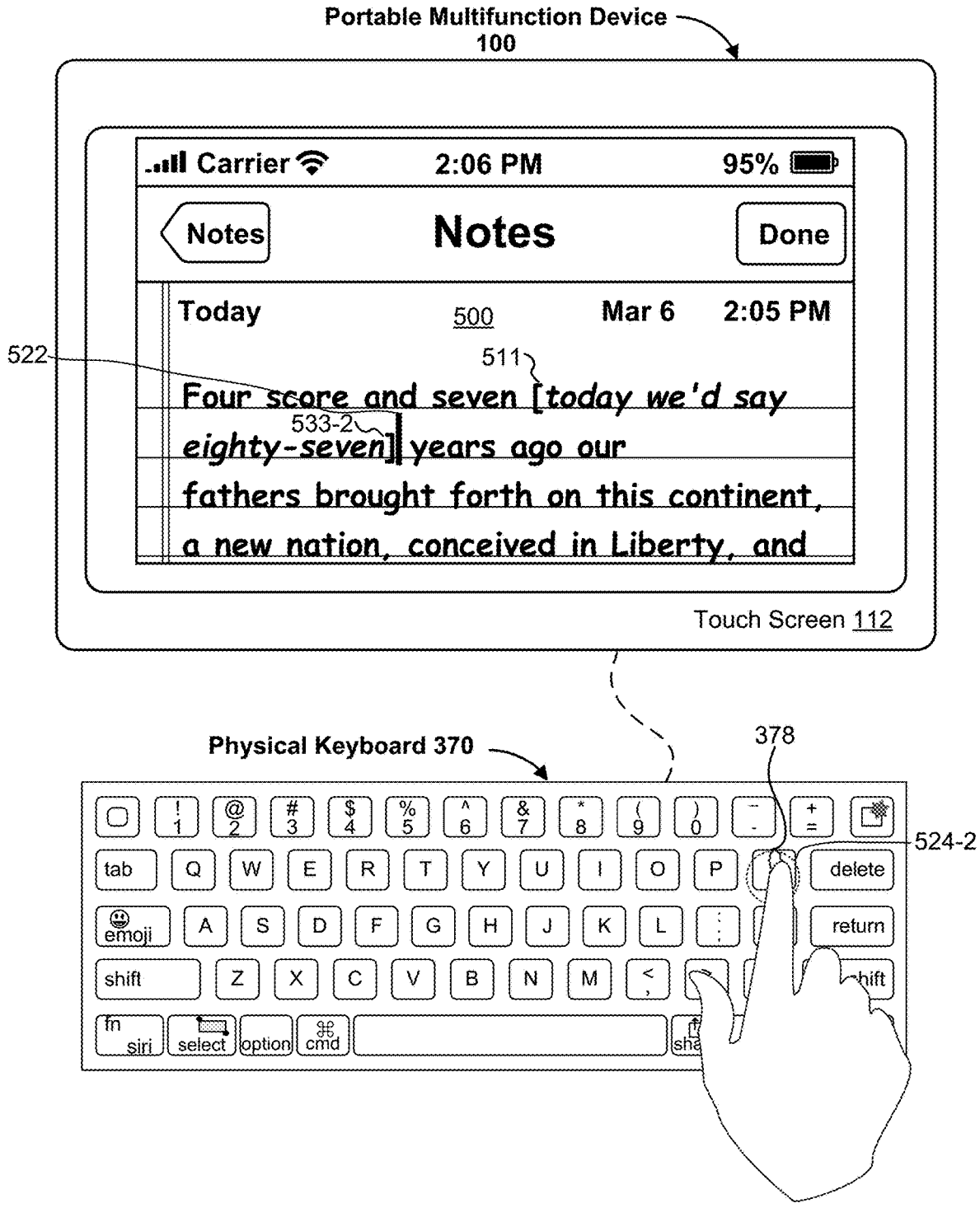

Portable Multifunction Device
100
Carrier
2:06 PM
95%
Notes
Notes
Done
Today
500
Mar 6
2:05 PM
522
511
Four score and seven [today we'd say
533-2
eighty-seven] years ago our
fathers brought forth on this continent,
a new nation, conceived in Liberty, and
Touch Screen 112
Physical Keyboard 370
378
524-2
tab
delete
emoji
return
shift
fn
siri
select
option
cmd

Figure 5D

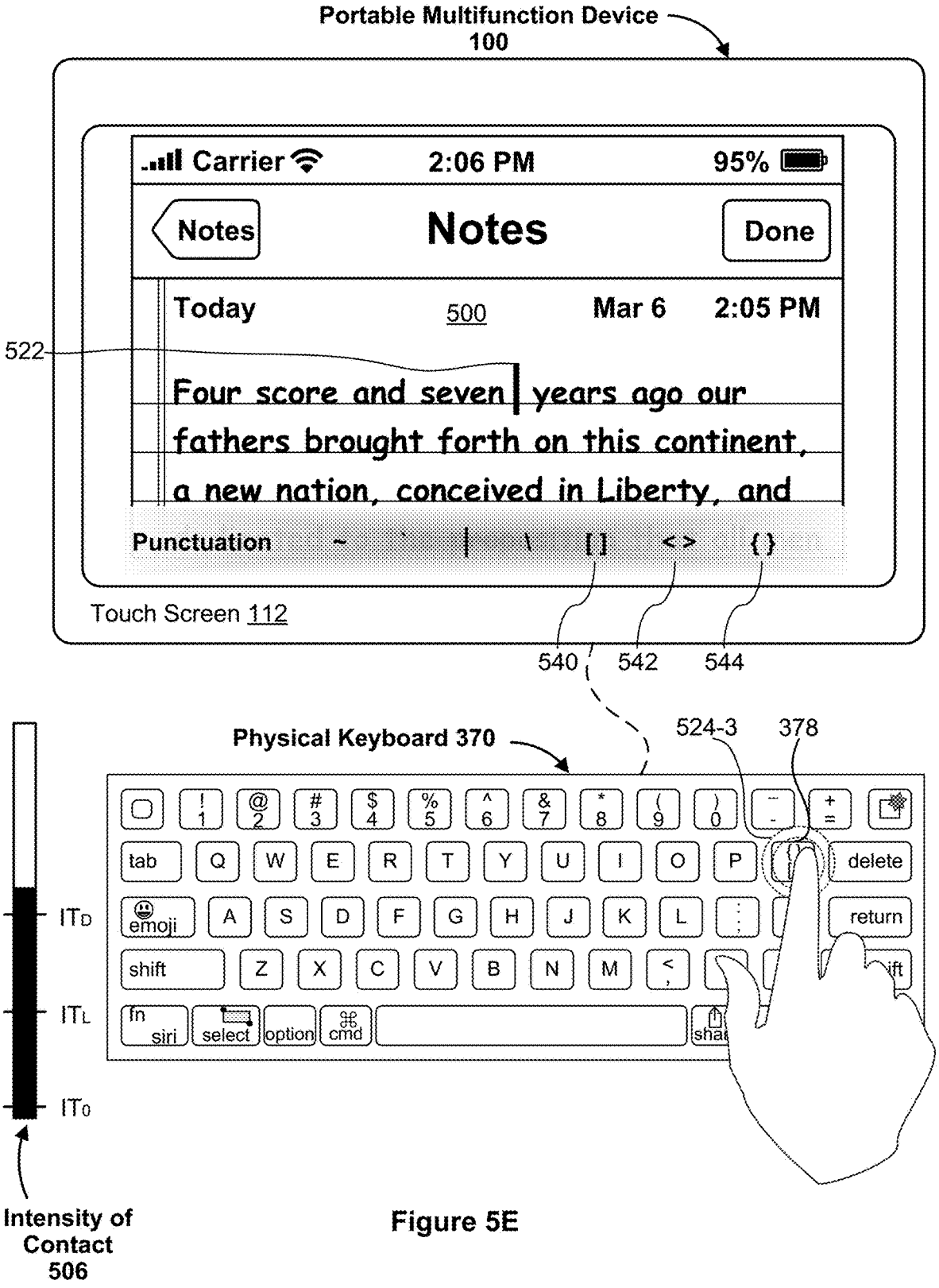

Portable Multifunction Device
100
Carrier
2:06 PM
95%
Notes
Notes
Done
Today
500
Mar 6
2:05 PM
522
Four score and seven years ago our
fathers brought forth on this continent,
a new nation, conceived in Liberty, and
Punctuation ~ ` | \ [ ] < > { }
Touch Screen 112
540
542
544
Physical Keyboard 370
524-3
378
tab
delete
emoji
return
shift
fn
siri
select
option
cmd
IT_D
IT_L
IT_0
Intensity of
Contact
506

Figure 5E

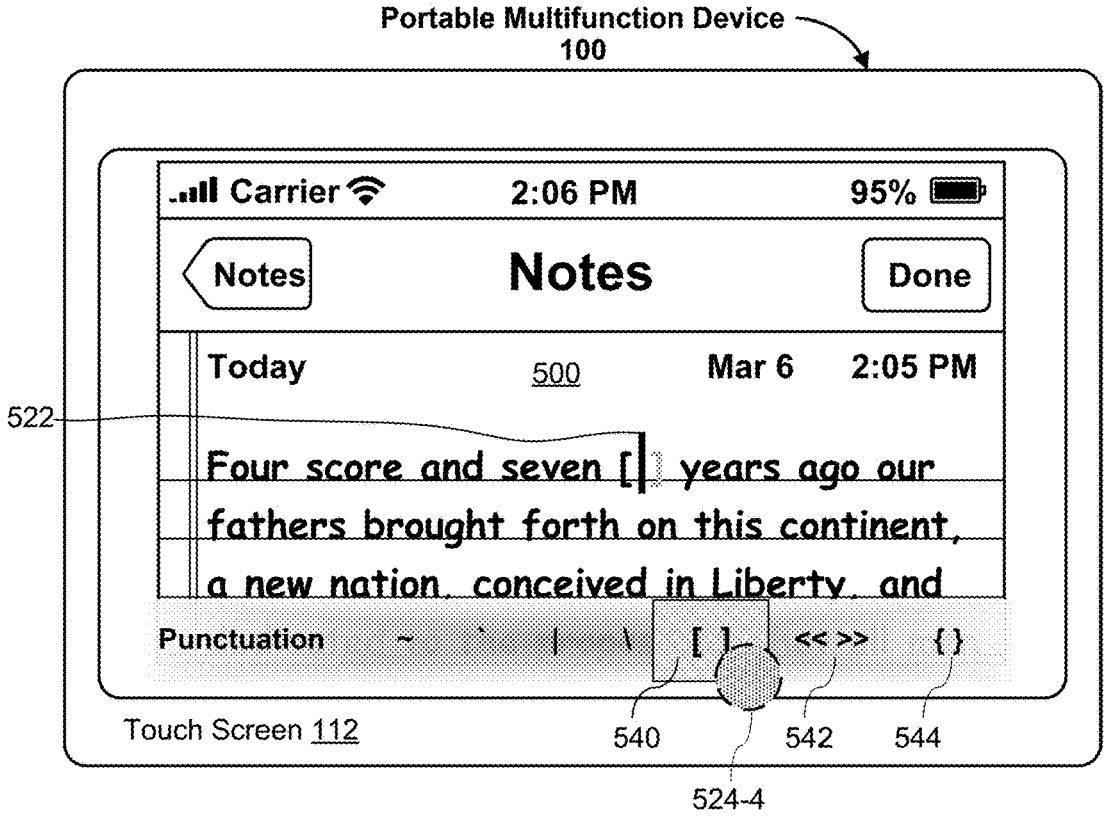


Figure 5F

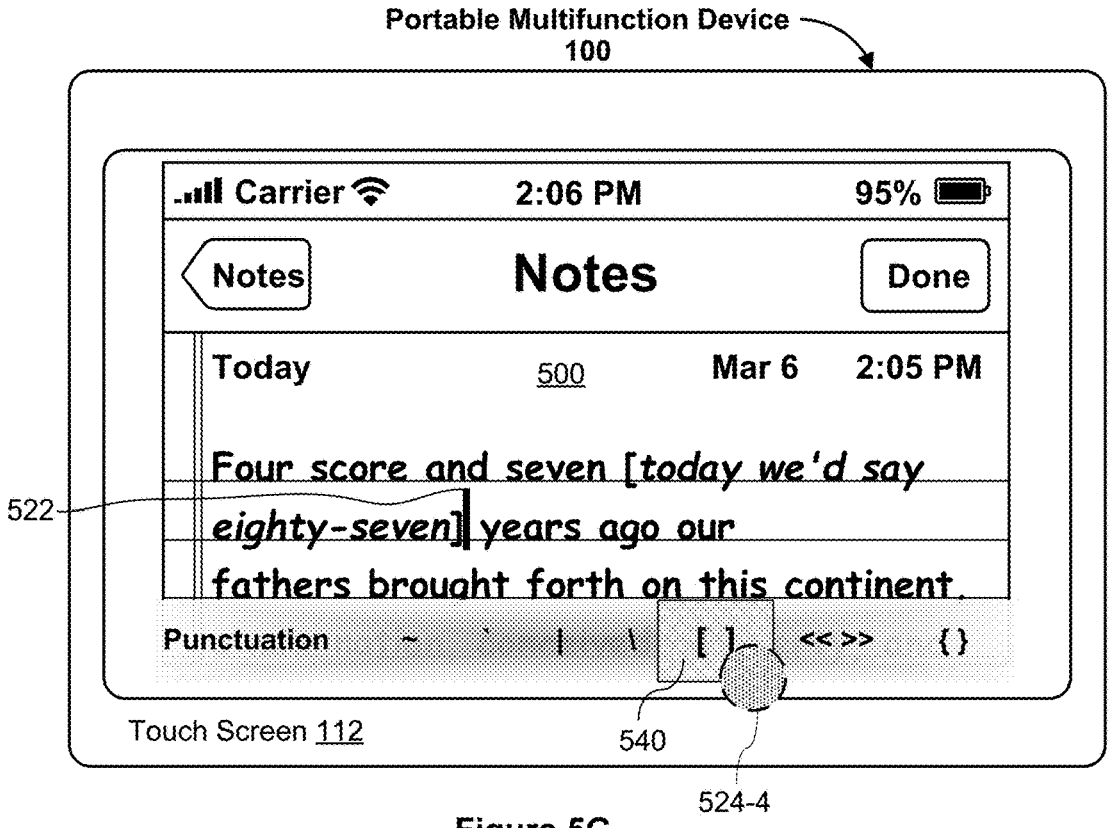


Figure 5G

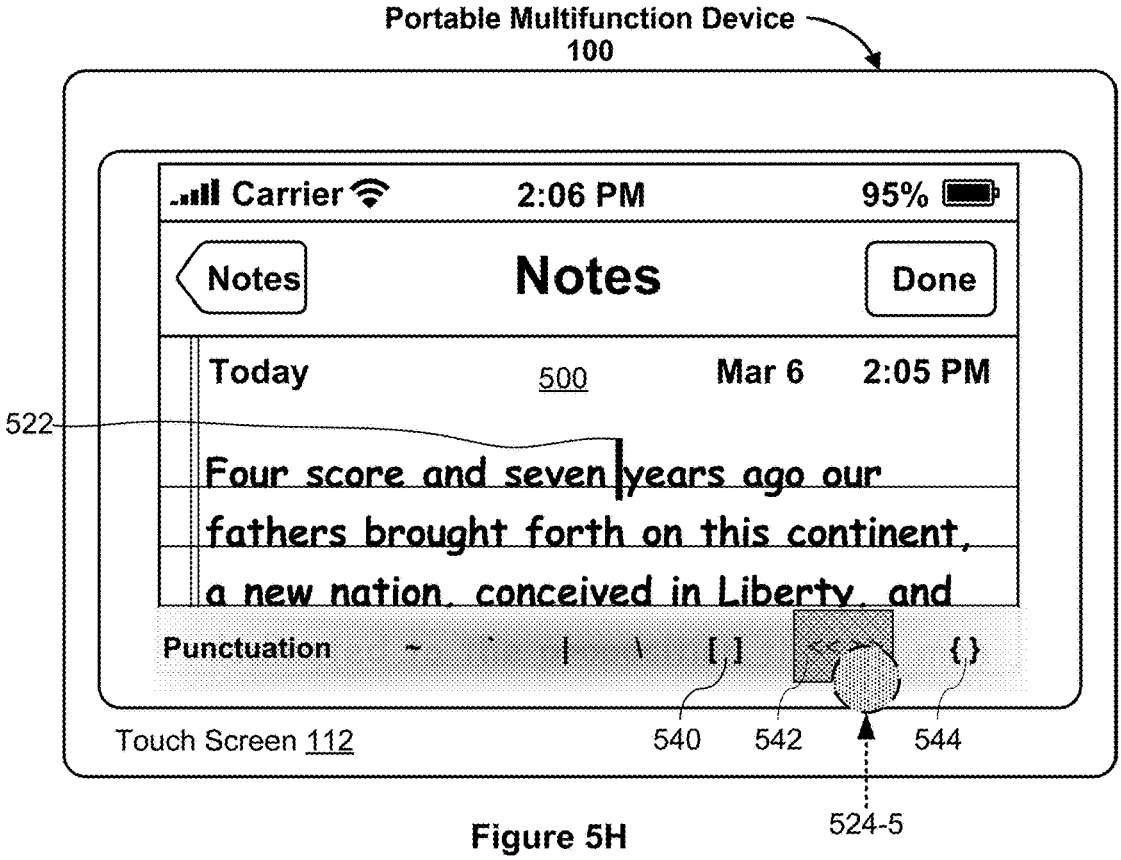


Figure 5H

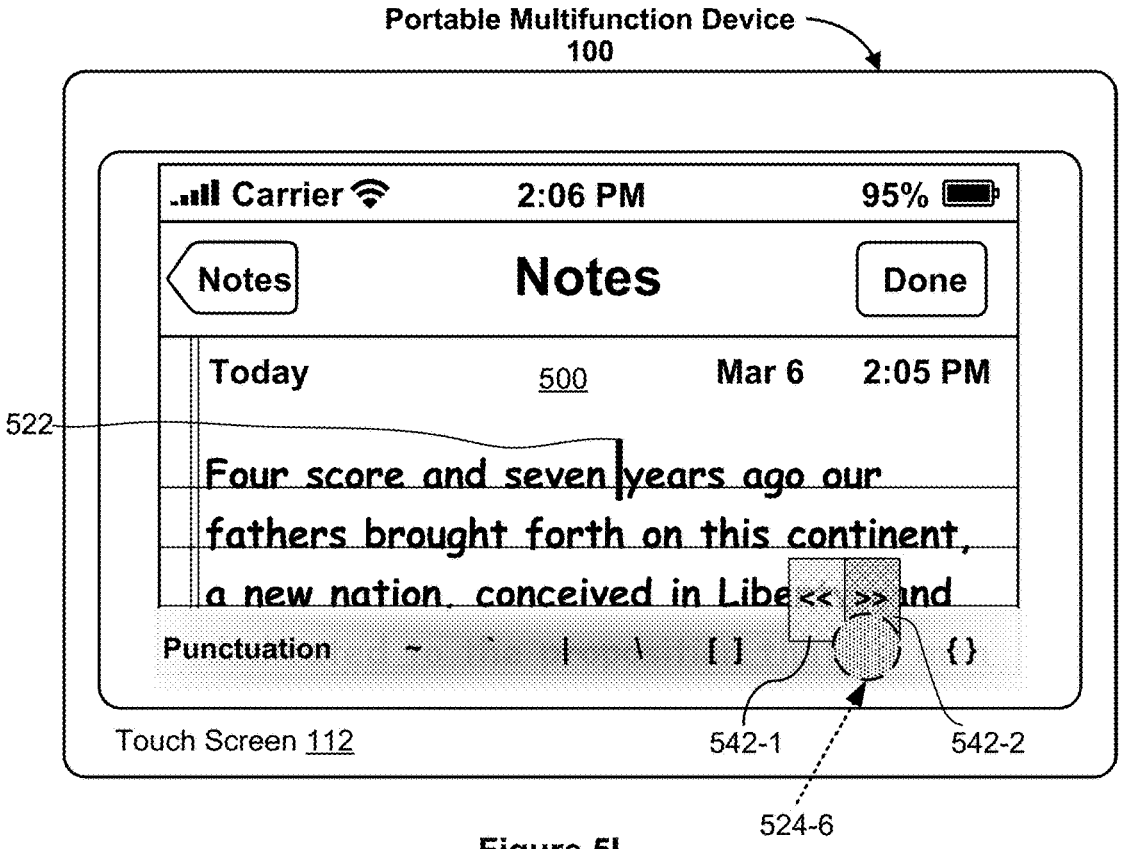


Figure 5I

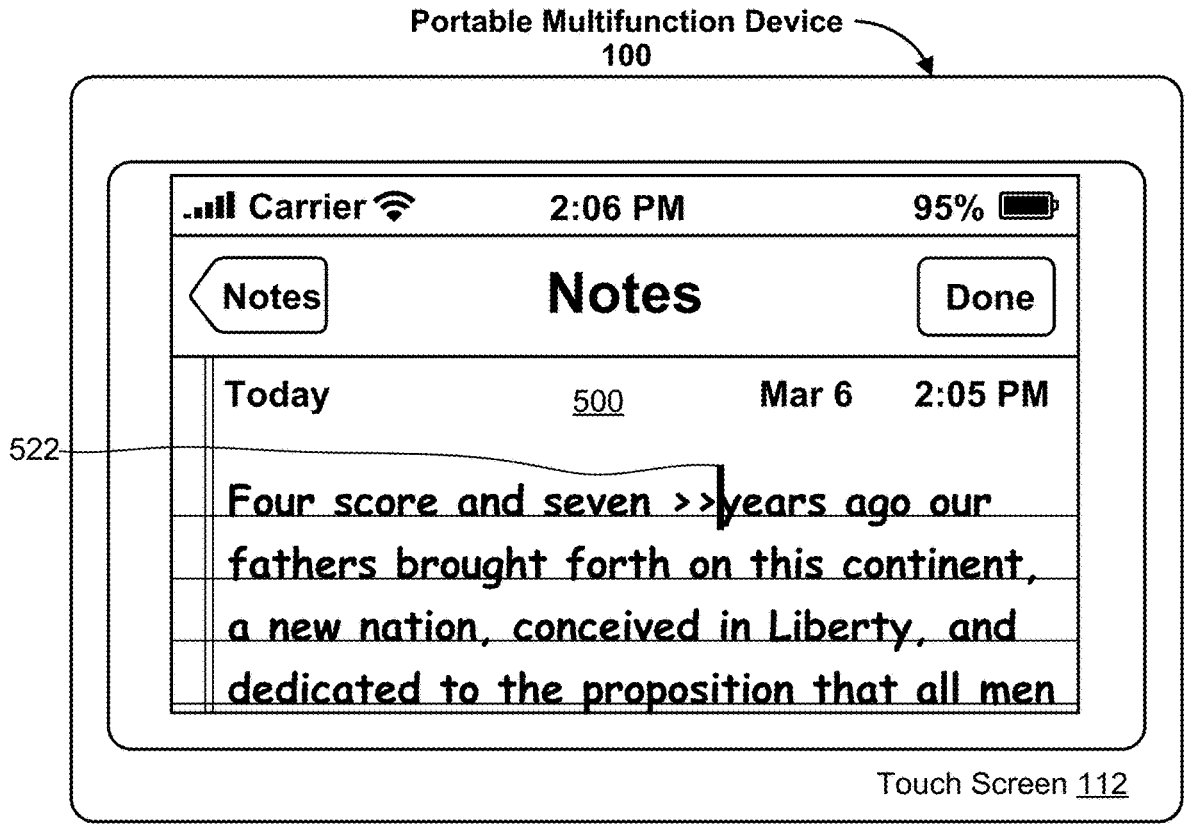

Portable Multifunction Device
100
Carrier
2:06 PM
95%
Notes
Notes
Done
Today
500
Mar 6
2:05 PM
522
Four score and seven >>years ago our fathers brought forth on this continent, a new nation, conceived in Liberty, and dedicated to the proposition that all men
Touch Screen 112

Figure 5J

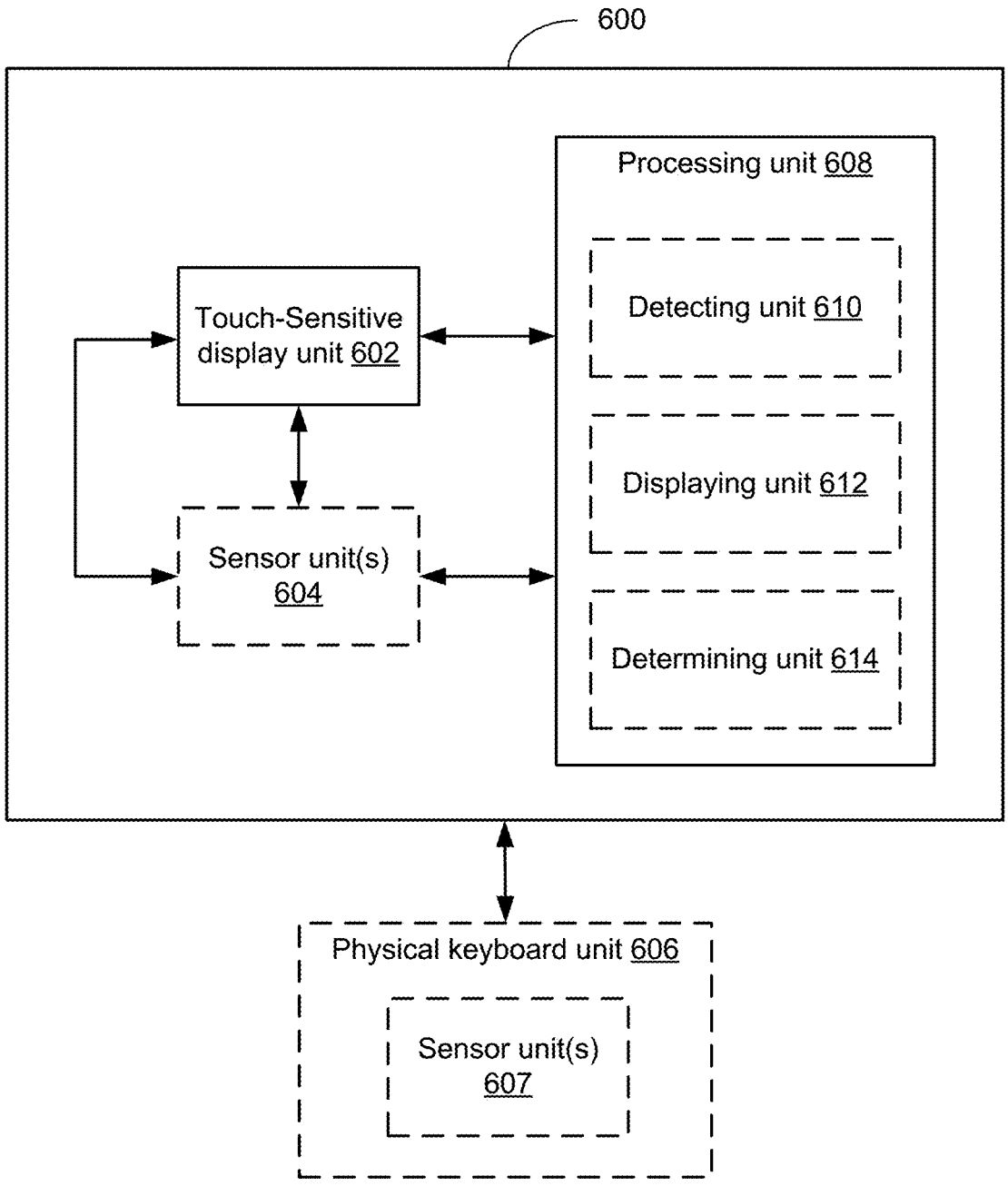

600
Processing unit 608
Detecting unit 610
Displaying unit 612
Determining unit 614
Touch-Sensitive display unit 602
Sensor unit(s) 604
Physical keyboard unit 606
Sensor unit(s) 607

Figure 6

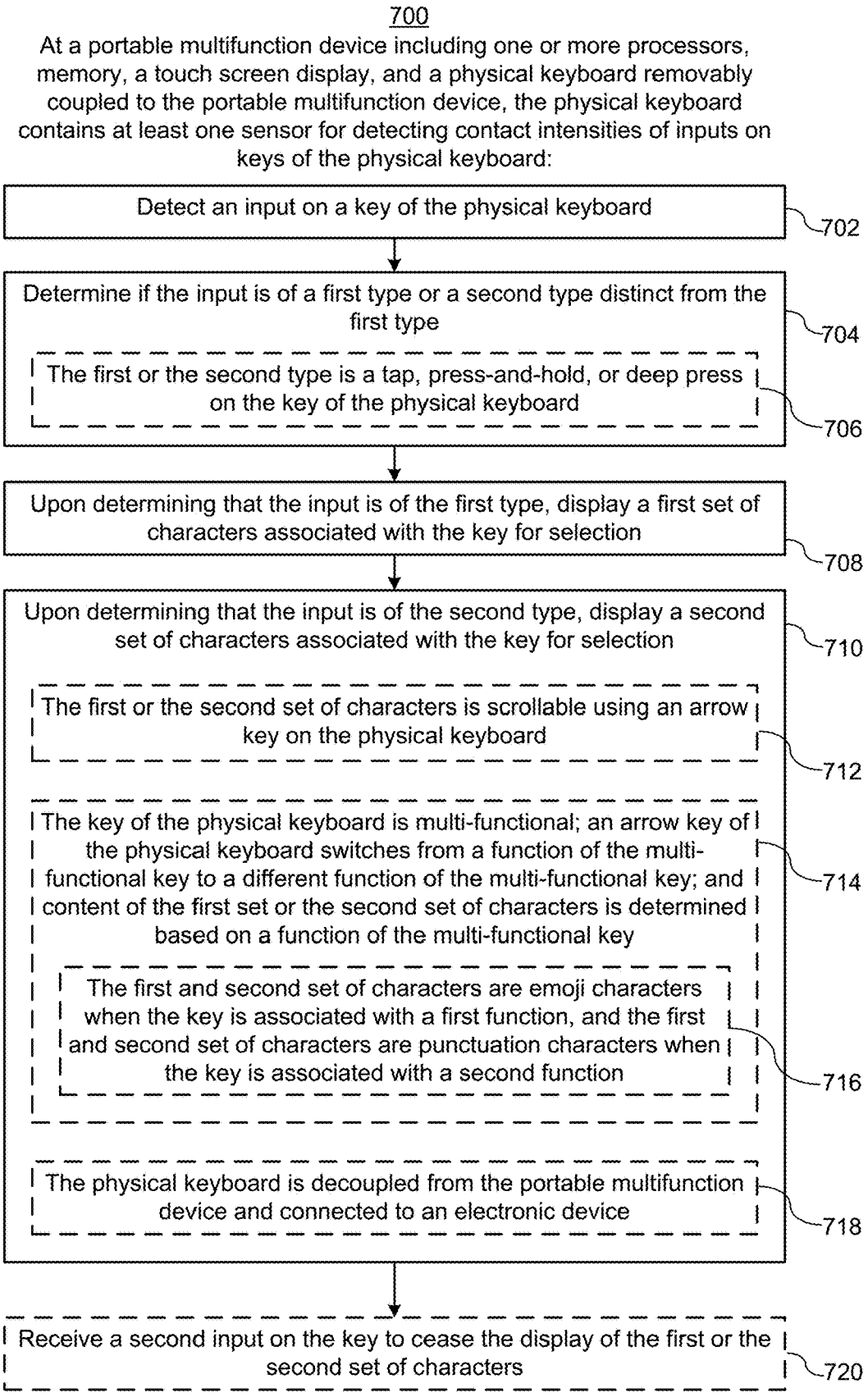

700
At a portable multifunction device including one or more processors, memory, a touch screen display, and a physical keyboard removably coupled to the portable multifunction device, the physical keyboard contains at least one sensor for detecting contact intensities of inputs on keys of the physical keyboard:
Detect an input on a key of the physical keyboard
702
Determine if the input is of a first type or a second type distinct from the first type
704
The first or the second type is a tap, press-and-hold, or deep press on the key of the physical keyboard
706
Upon determining that the input is of the first type, display a first set of characters associated with the key for selection
708
Upon determining that the input is of the second type, display a second set of characters associated with the key for selection
710
The first or the second set of characters is scrollable using an arrow key on the physical keyboard
712
The key of the physical keyboard is multi-functional; an arrow key of the physical keyboard switches from a function of the multi-functional key to a different function of the multi-functional key; and content of the first set or the second set of characters is determined based on a function of the multi-functional key
714
The first and second set of characters are emoji characters when the key is associated with a first function, and the first and second set of characters are punctuation characters when the key is associated with a second function
716
The physical keyboard is decoupled from the portable multifunction device and connected to an electronic device
718
Receive a second input on the key to cease the display of the first or the second set of characters
720

Figure 7

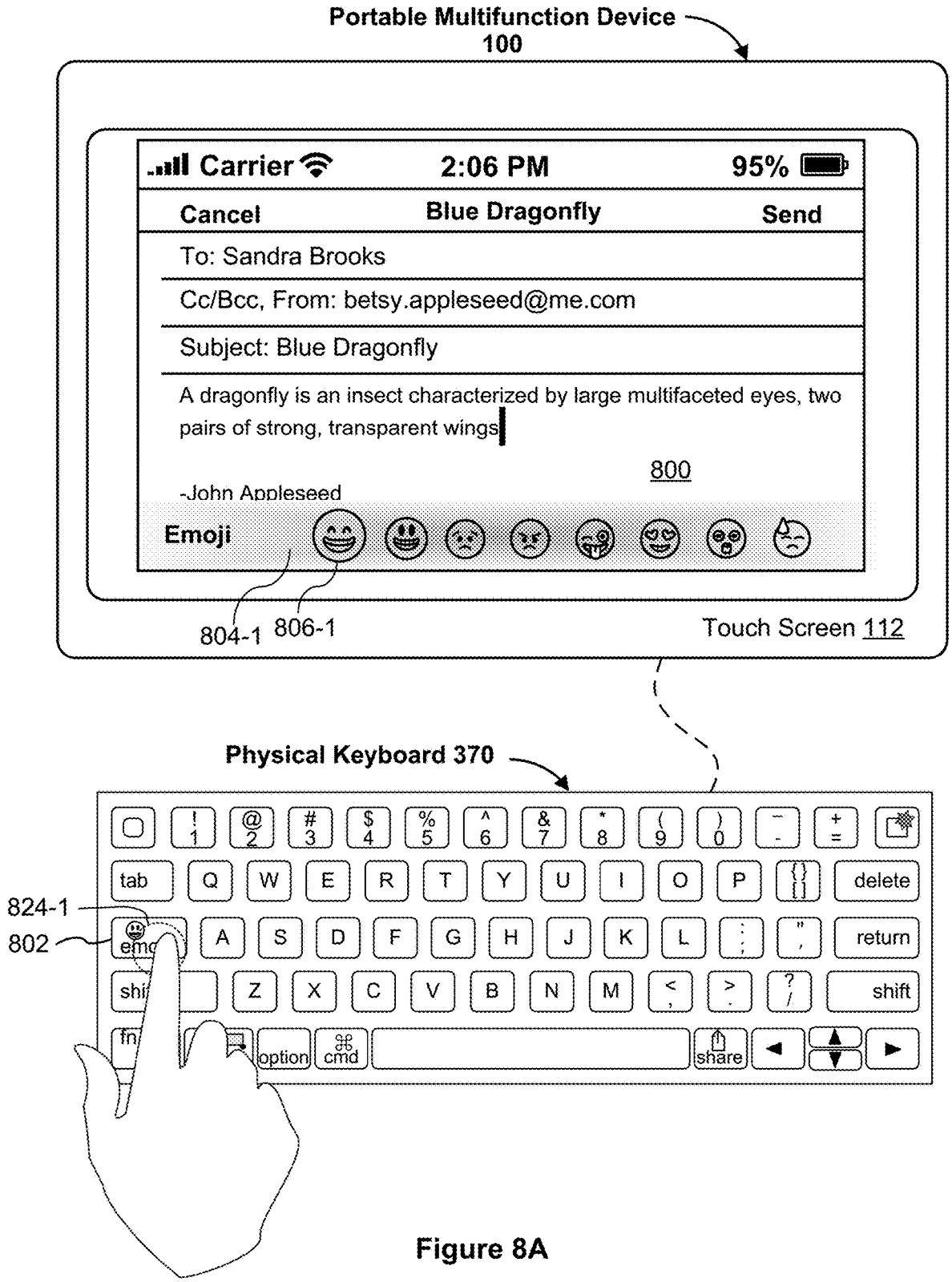

Portable Multifunction Device
100
Carrier
2:06 PM
95%
Cancel
Blue Dragonfly
Send
To: Sandra Brooks
Cc/Bcc, From: betsy.appleseed@me.com
Subject: Blue Dragonfly
A dragonfly is an insect characterized by large multifaceted eyes, two pairs of strong, transparent wings
800
-John Appleseed
Emoji
804-1
806-1
Touch Screen 112
Physical Keyboard 370
824-1
802
tab
delete
return
shift
option
cmd
share

Figure 8A

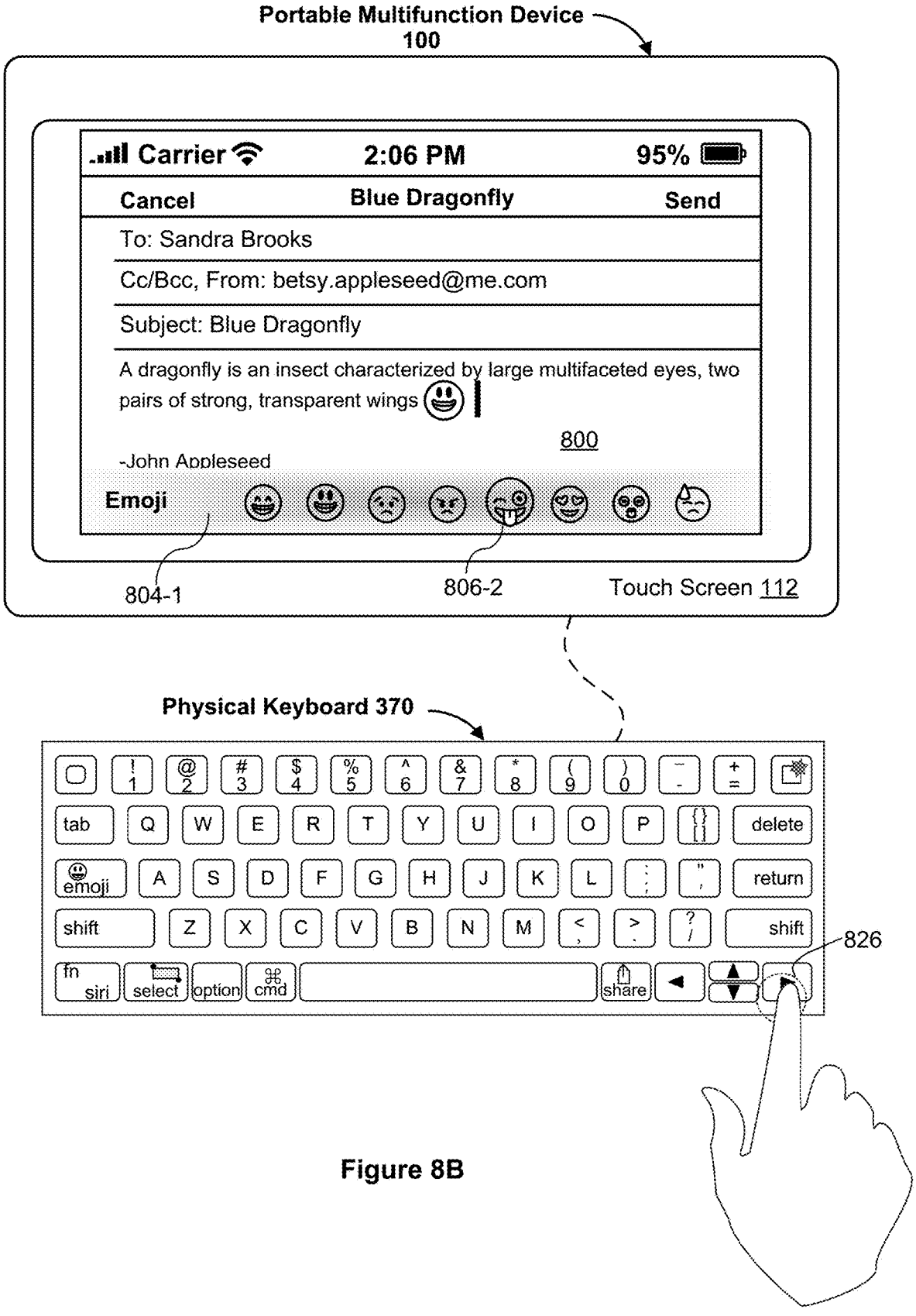

Portable Multifunction Device
100
Carrier
2:06 PM
95%
Cancel
Blue Dragonfly
Send
To: Sandra Brooks
Cc/Bcc, From: betsy.appleseed@me.com
Subject: Blue Dragonfly
A dragonfly is an insect characterized by large multifaceted eyes, two pairs of strong, transparent wings
800
-John Appleseed
Emoji
804-1
806-2
Touch Screen 112
Physical Keyboard 370
826

Figure 8B

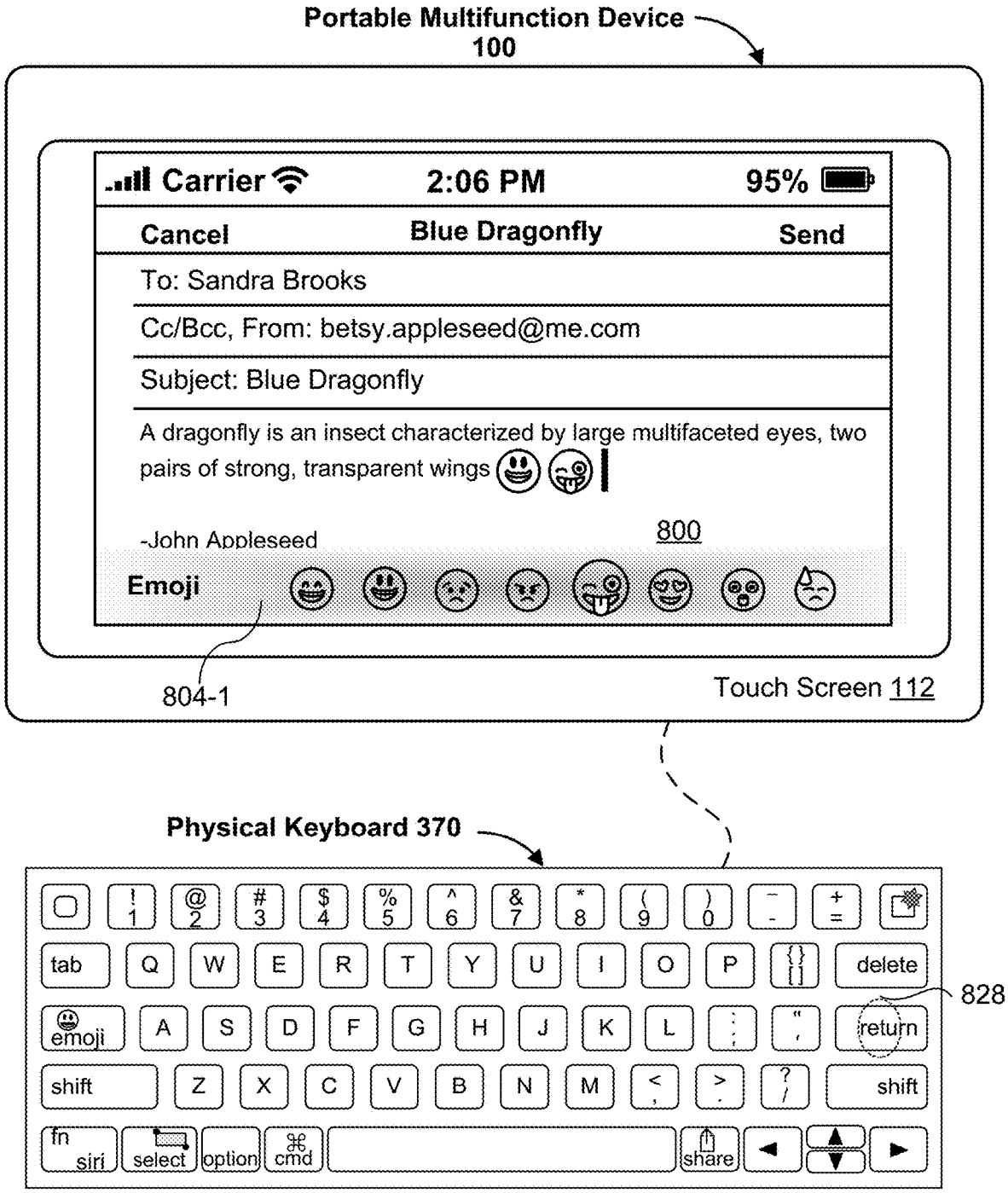

Portable Multifunction Device
100
Carrier
2:06 PM
95%
Cancel
Blue Dragonfly
Send
To: Sandra Brooks
Cc/Bcc, From: betsy.appleseed@me.com
Subject: Blue Dragonfly
A dragonfly is an insect characterized by large multifaceted eyes, two pairs of strong, transparent wings
-John Appleseed
800
Emoji
804-1
Touch Screen 112
Physical Keyboard 370
tab
delete
emoji
return
828
shift
fn
siri
select
option
cmd
share

Figure 8C

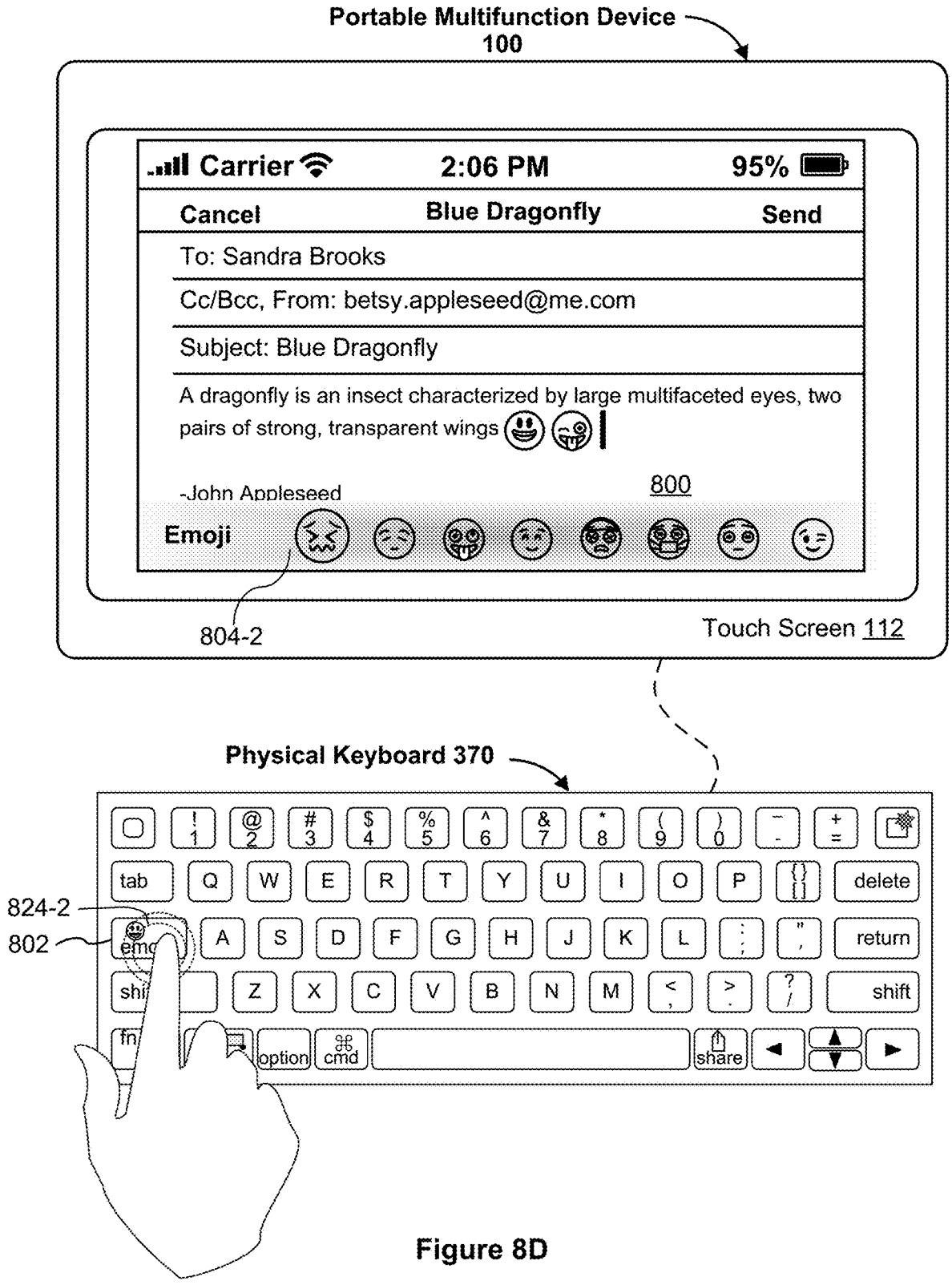

Portable Multifunction Device
100
Carrier
2:06 PM
95%
Cancel
Blue Dragonfly
Send
To: Sandra Brooks
Cc/Bcc, From: betsy.appleseed@me.com
Subject: Blue Dragonfly
A dragonfly is an insect characterized by large multifaceted eyes, two pairs of strong, transparent wings
-John Appleseed
800
Emoji
804-2
Touch Screen 112
Physical Keyboard 370
824-2
802
tab
delete
return
shift
option
cmd
share

Figure 8D

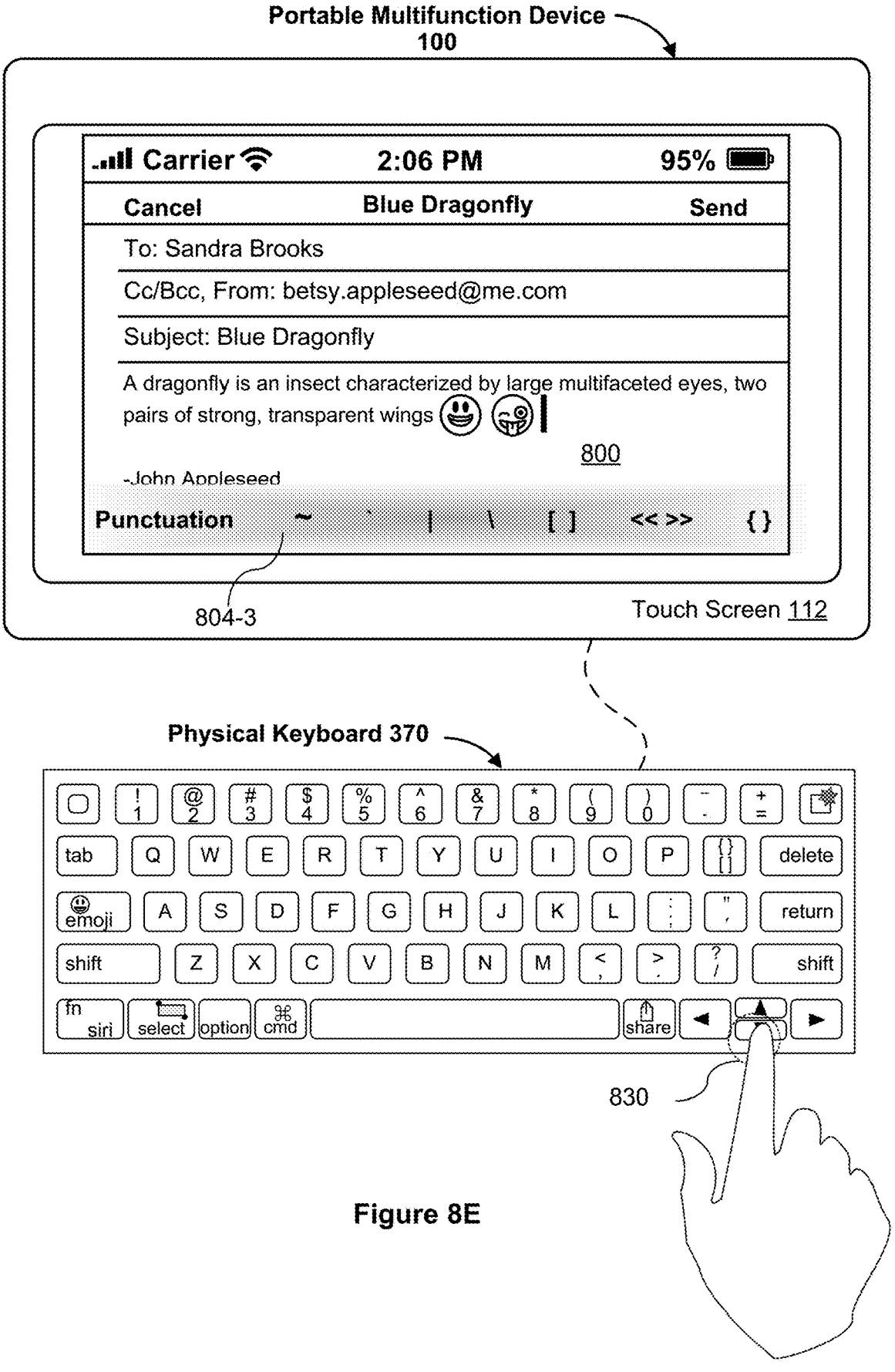

Portable Multifunction Device
100
Carrier
2:06 PM
95%
Cancel
Blue Dragonfly
Send
To: Sandra Brooks
Cc/Bcc, From: betsy.appleseed@me.com
Subject: Blue Dragonfly
A dragonfly is an insect characterized by large multifaceted eyes, two pairs of strong, transparent wings
800
-John Appleseed
Punctuation ~ ` | \ [ ] << >> { }
804-3
Touch Screen 112
Physical Keyboard 370
tab
delete
emoji
return
shift
shift
fn
siri
select
option
cmd
share
830

Figure 8E

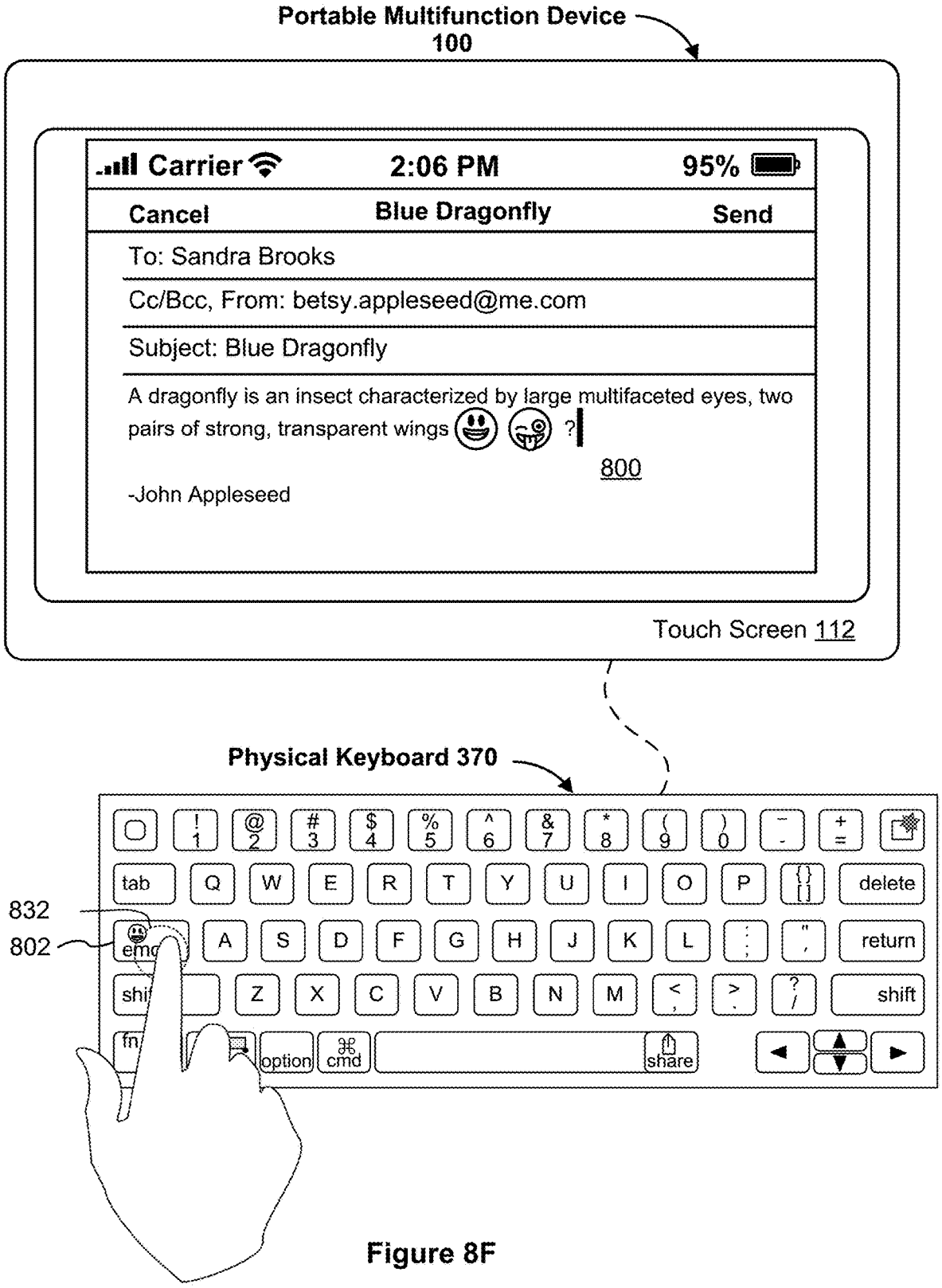

Portable Multifunction Device
100
Carrier
2:06 PM
95%
Cancel
Blue Dragonfly
Send
To: Sandra Brooks
Cc/Bcc, From: betsy.appleseed@me.com
Subject: Blue Dragonfly
A dragonfly is an insect characterized by large multifaceted eyes, two pairs of strong, transparent wings ?
800
-John Appleseed
Touch Screen 112
Physical Keyboard 370
832
802
tab
delete
return
shift
option
cmd
share

Figure 8F

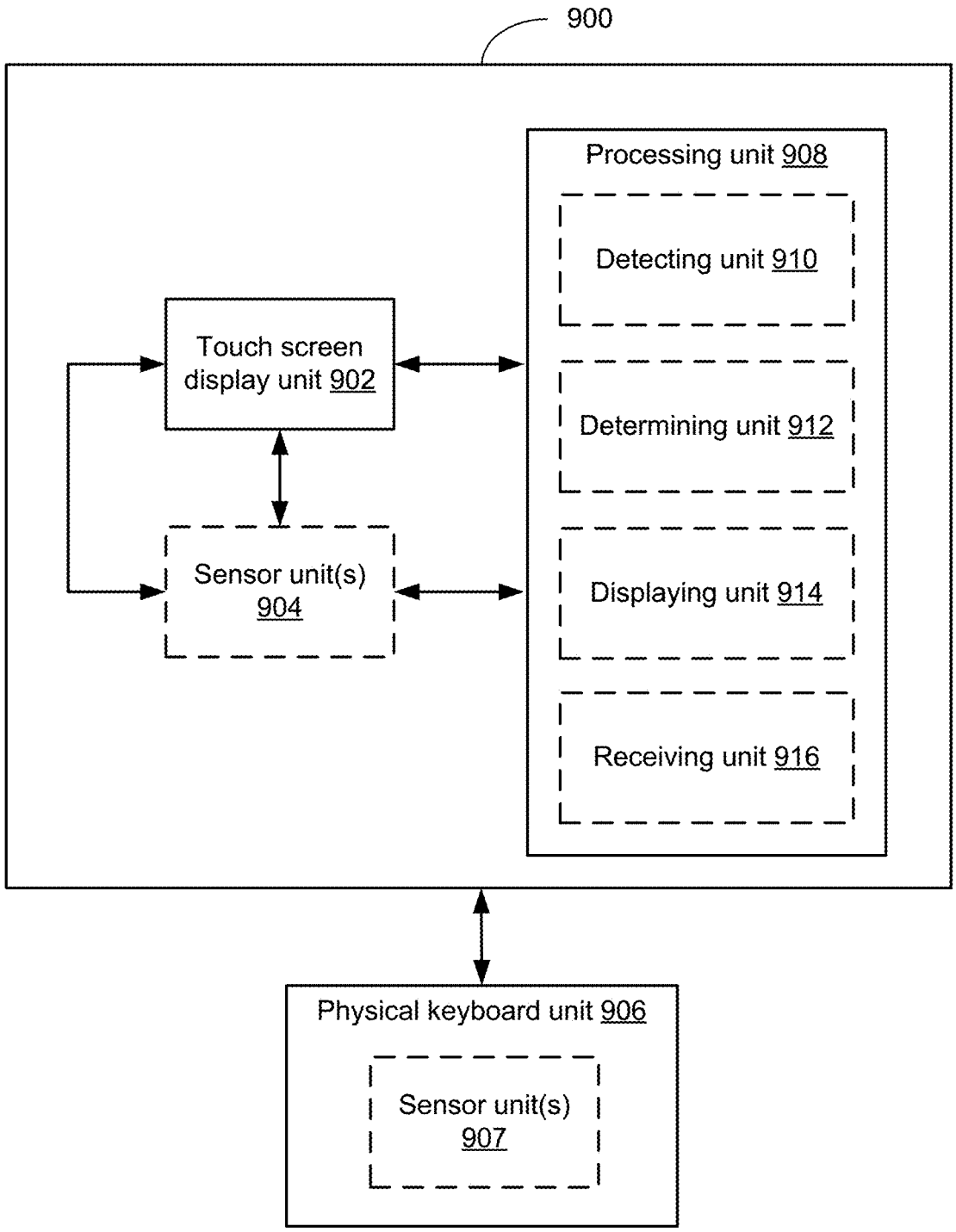

900
Processing unit 908
Detecting unit 910
Touch screen display unit 902
Determining unit 912
Sensor unit(s) 904
Displaying unit 914
Receiving unit 916
Physical keyboard unit 906
Sensor unit(s) 907

Figure 9

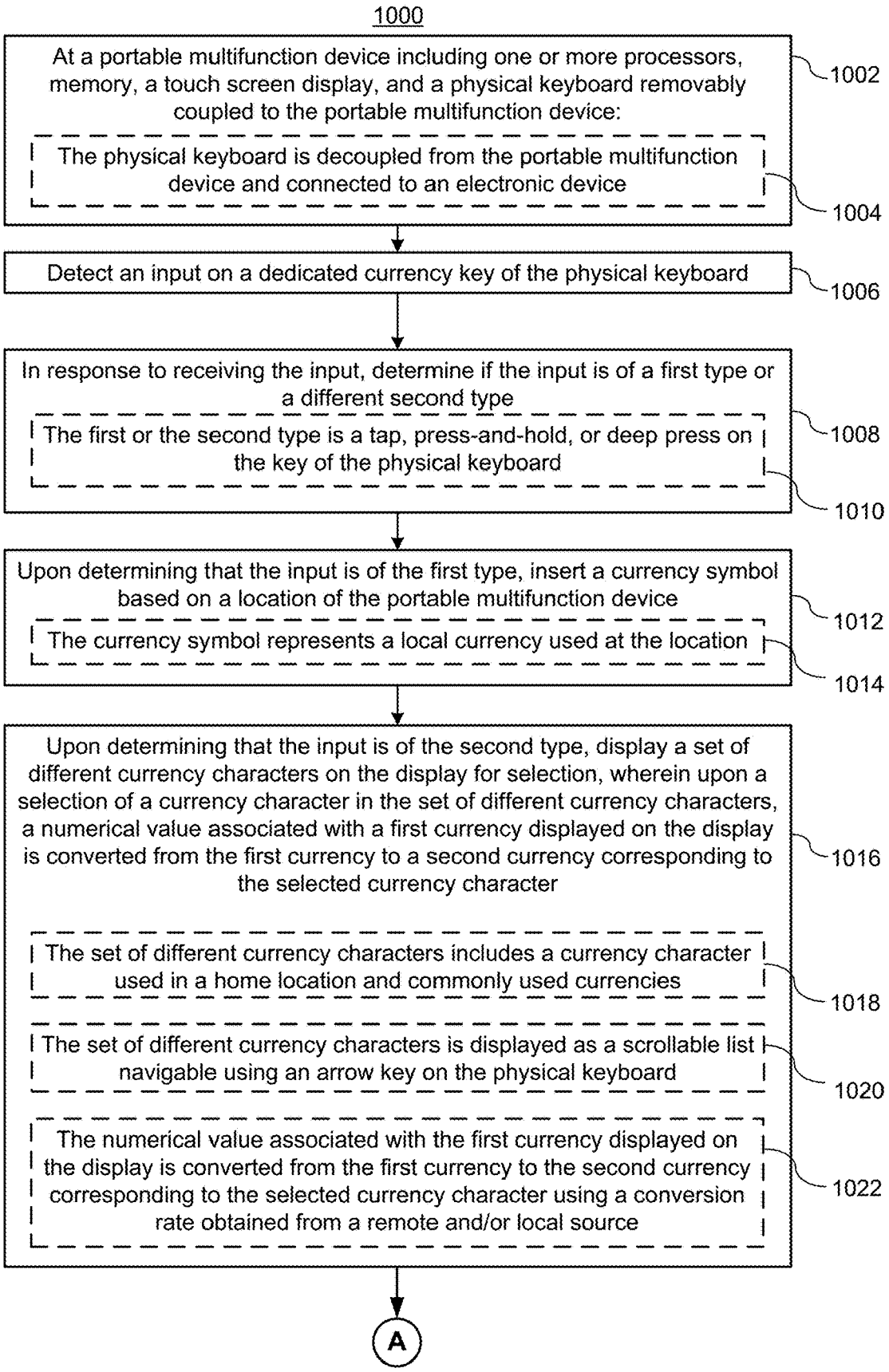

1000
At a portable multifunction device including one or more processors, memory, a touch screen display, and a physical keyboard removably coupled to the portable multifunction device:
1002
The physical keyboard is decoupled from the portable multifunction device and connected to an electronic device
1004
Detect an input on a dedicated currency key of the physical keyboard
1006
In response to receiving the input, determine if the input is of a first type or a different second type
1008
The first or the second type is a tap, press-and-hold, or deep press on the key of the physical keyboard
1010
Upon determining that the input is of the first type, insert a currency symbol based on a location of the portable multifunction device
1012
The currency symbol represents a local currency used at the location
1014
Upon determining that the input is of the second type, display a set of different currency characters on the display for selection, wherein upon a selection of a currency character in the set of different currency characters, a numerical value associated with a first currency displayed on the display is converted from the first currency to a second currency corresponding to the selected currency character
1016
The set of different currency characters includes a currency character used in a home location and commonly used currencies
1018
The set of different currency characters is displayed as a scrollable list navigable using an arrow key on the physical keyboard
1020
The numerical value associated with the first currency displayed on the display is converted from the first currency to the second currency corresponding to the selected currency character using a conversion rate obtained from a remote and/or local source
1022
A

Figure 10A

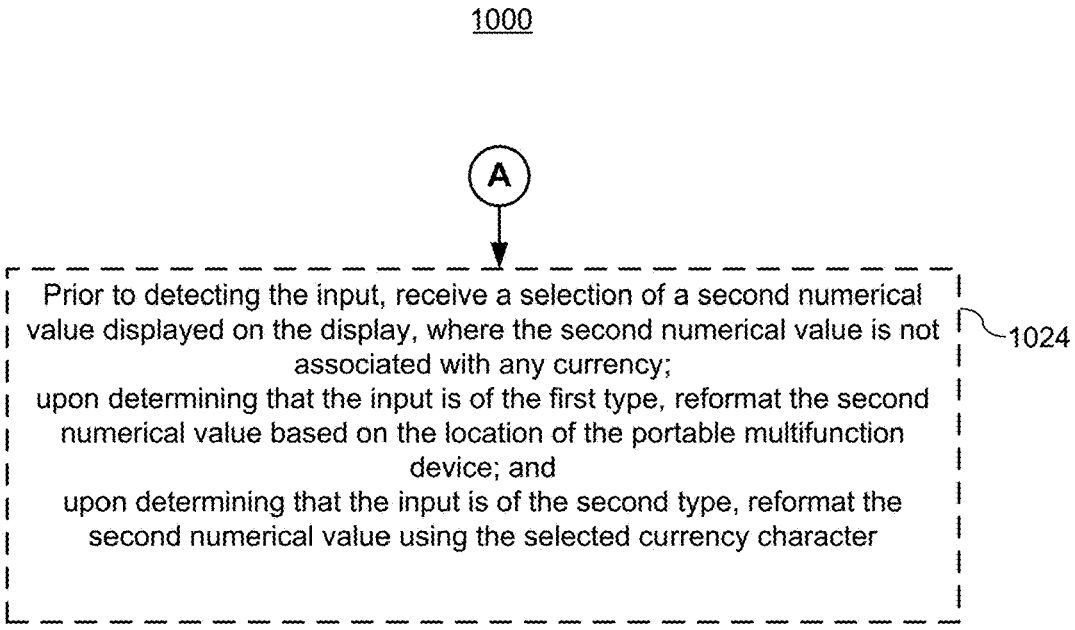

1000
A
Prior to detecting the input, receive a selection of a second numerical value displayed on the display, where the second numerical value is not associated with any currency;
upon determining that the input is of the first type, reformat the second numerical value based on the location of the portable multifunction device; and
upon determining that the input is of the second type, reformat the second numerical value using the selected currency character
1024

Figure 10B

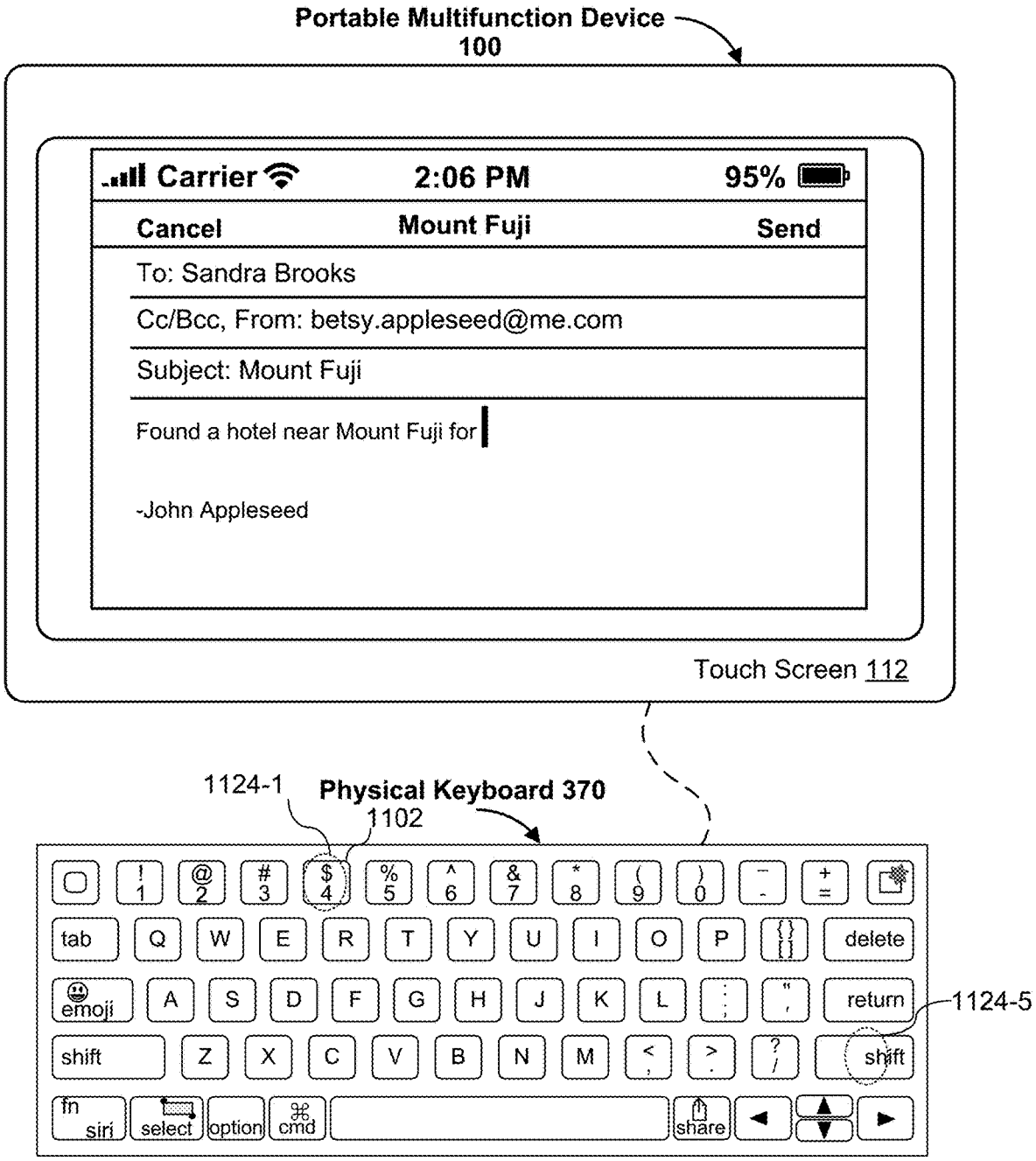

Portable Multifunction Device
100
Carrier
2:06 PM
95%
Cancel
Mount Fuji
Send
To: Sandra Brooks
Cc/Bcc, From: betsy.appleseed@me.com
Subject: Mount Fuji
Found a hotel near Mount Fuji for
-John Appleseed
Touch Screen 112
1124-1
Physical Keyboard 370
1102
1124-5

Figure 11A

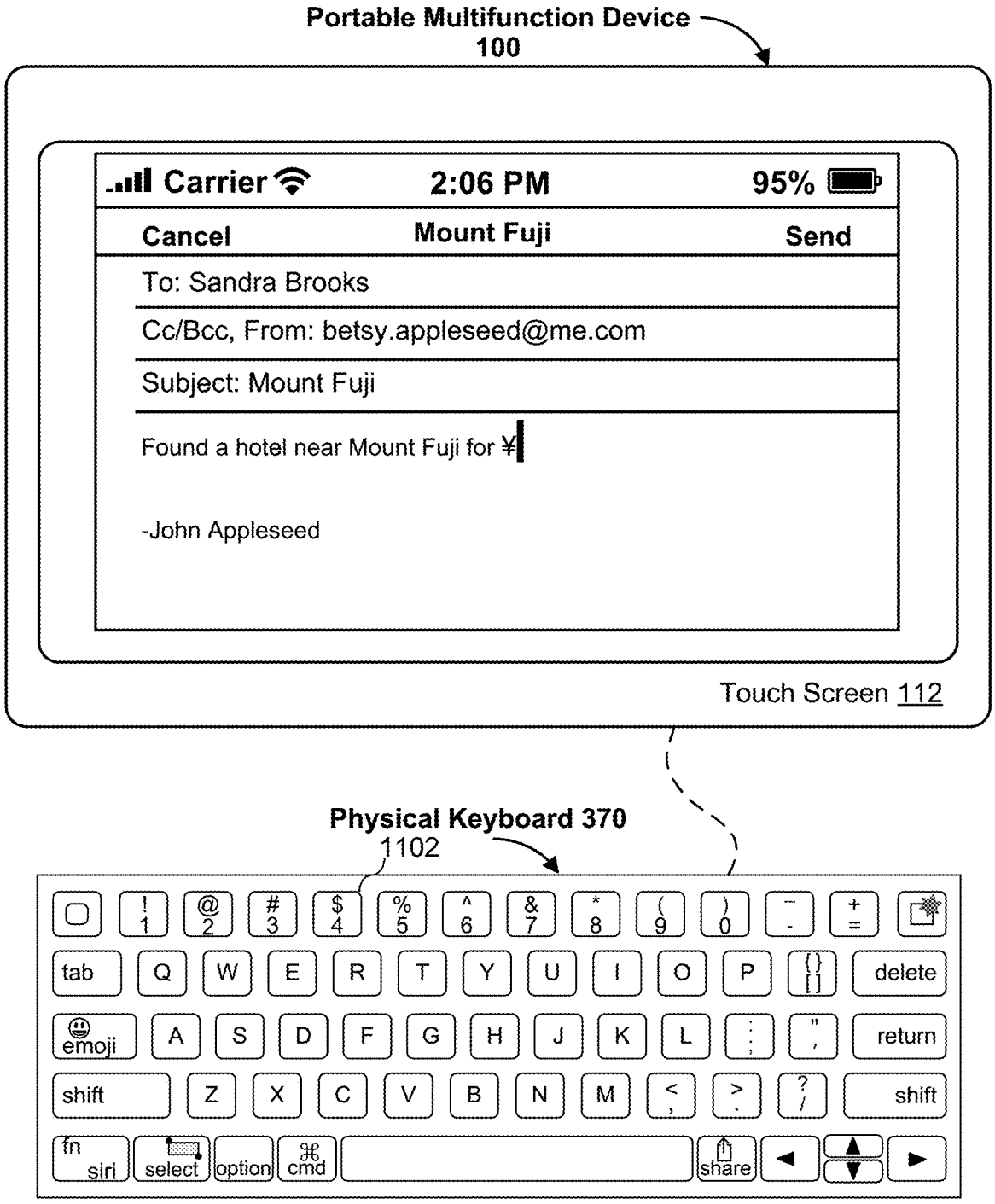

Portable Multifunction Device
100
Carrier
2:06 PM
95%
Cancel
Mount Fuji
Send
To: Sandra Brooks
Cc/Bcc, From: betsy.appleseed@me.com
Subject: Mount Fuji
Found a hotel near Mount Fuji for ¥
-John Appleseed
Touch Screen 112
Physical Keyboard 370
1102
tab
delete
emoji
return
shift
shift
fn
siri
select
option
cmd
share

Figure 11B

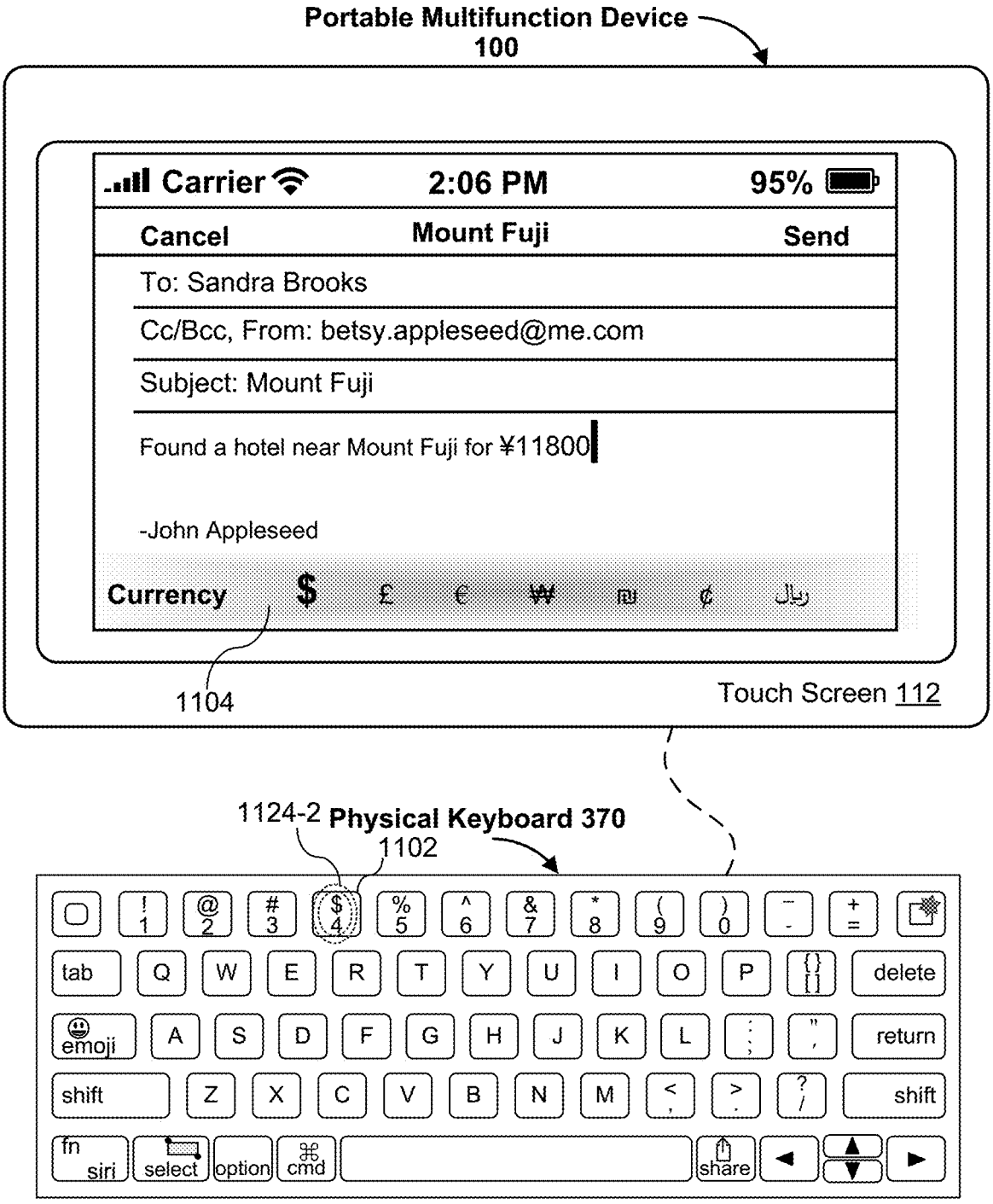

Portable Multifunction Device
100
Carrier
2:06 PM
95%
Cancel
Mount Fuji
Send
To: Sandra Brooks
Cc/Bcc, From: betsy.appleseed@me.com
Subject: Mount Fuji
Found a hotel near Mount Fuji for ¥11800
-John Appleseed
Currency
$
£
€
₩
₪
¢
ريال
1104
Touch Screen 112
1124-2
Physical Keyboard 370
1102
tab
delete
emoji
return
shift
shift
fn
siri
select
option
cmd
share

Figure 11C

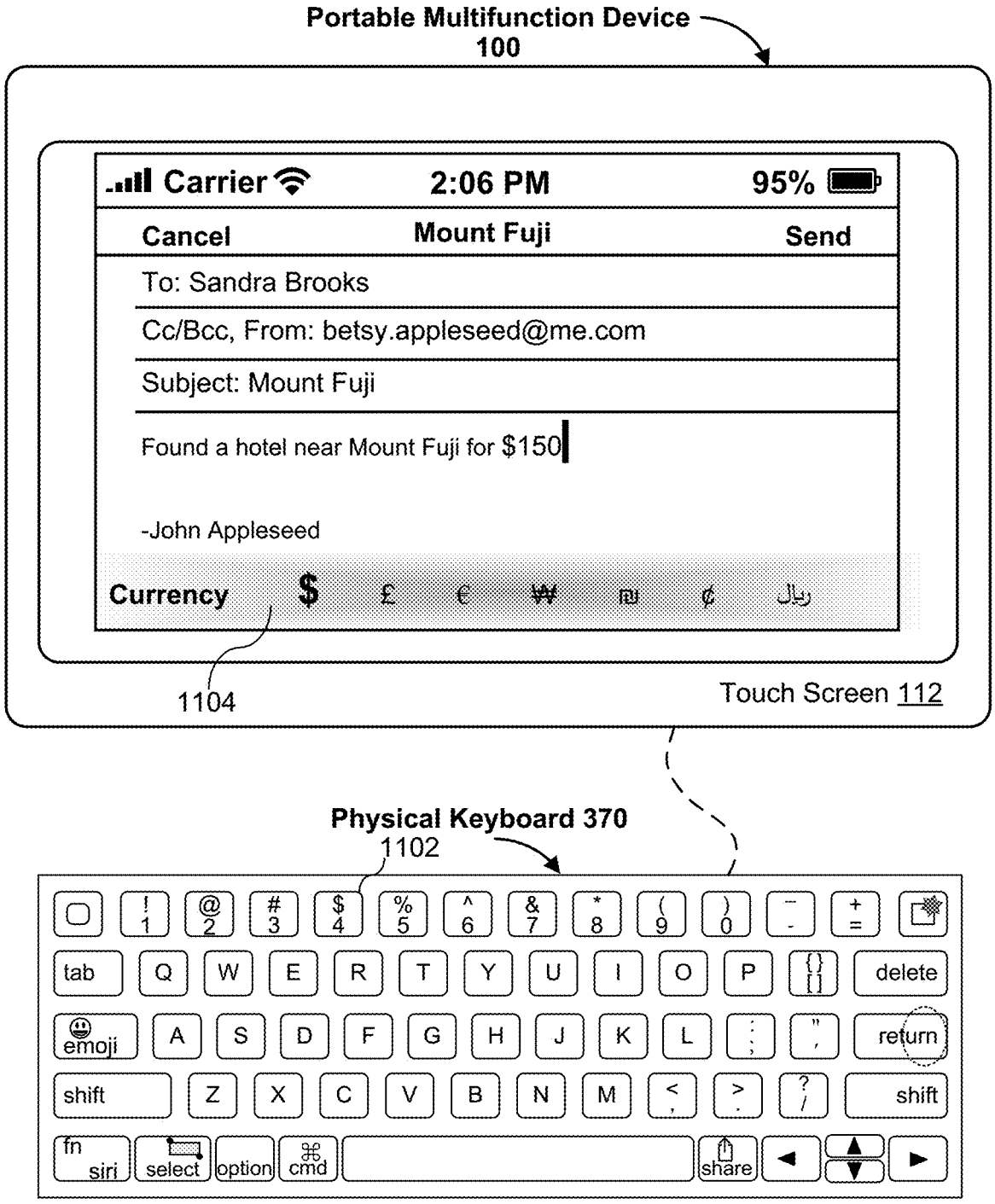

Portable Multifunction Device
100
Carrier
2:06 PM
95%
Cancel
Mount Fuji
Send
To: Sandra Brooks
Cc/Bcc, From: betsy.appleseed@me.com
Subject: Mount Fuji
Found a hotel near Mount Fuji for $150
-John Appleseed
Currency
$
£
€
₩
₪
¢
ريال
1104
Touch Screen 112
Physical Keyboard 370
1102
tab
delete
emoji
return
shift
shift
fn
siri
select
option
cmd
share

Figure 11D

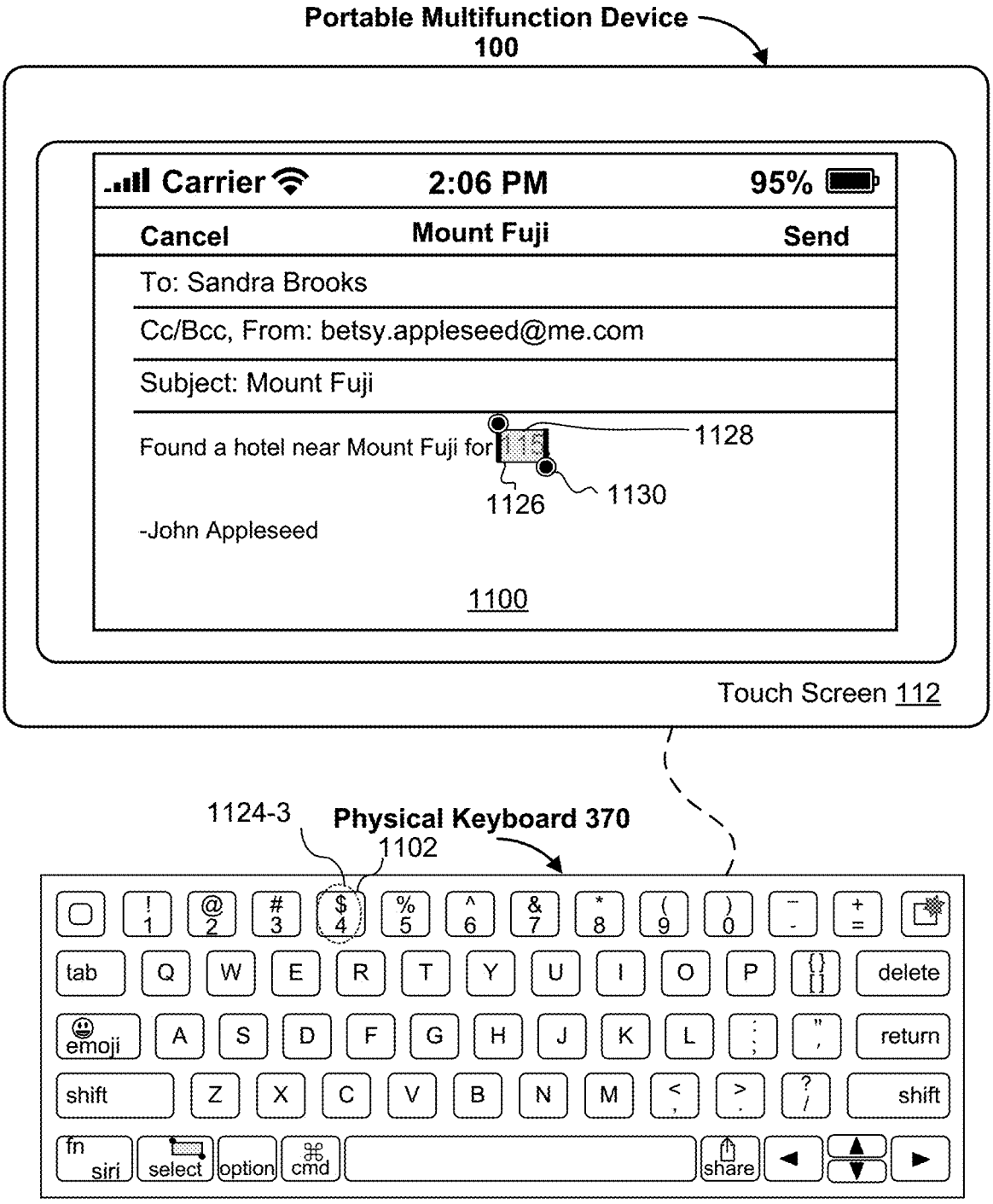

Portable Multifunction Device
100
Carrier
2:06 PM
95%
Cancel
Mount Fuji
Send
To: Sandra Brooks
Cc/Bcc, From: betsy.appleseed@me.com
Subject: Mount Fuji
Found a hotel near Mount Fuji for
1128
1126
1130
-John Appleseed
1100
Touch Screen 112
1124-3
Physical Keyboard 370
1102
tab
delete
emoji
return
shift
shift
fn
siri
select
option
cmd
share

Figure 11E

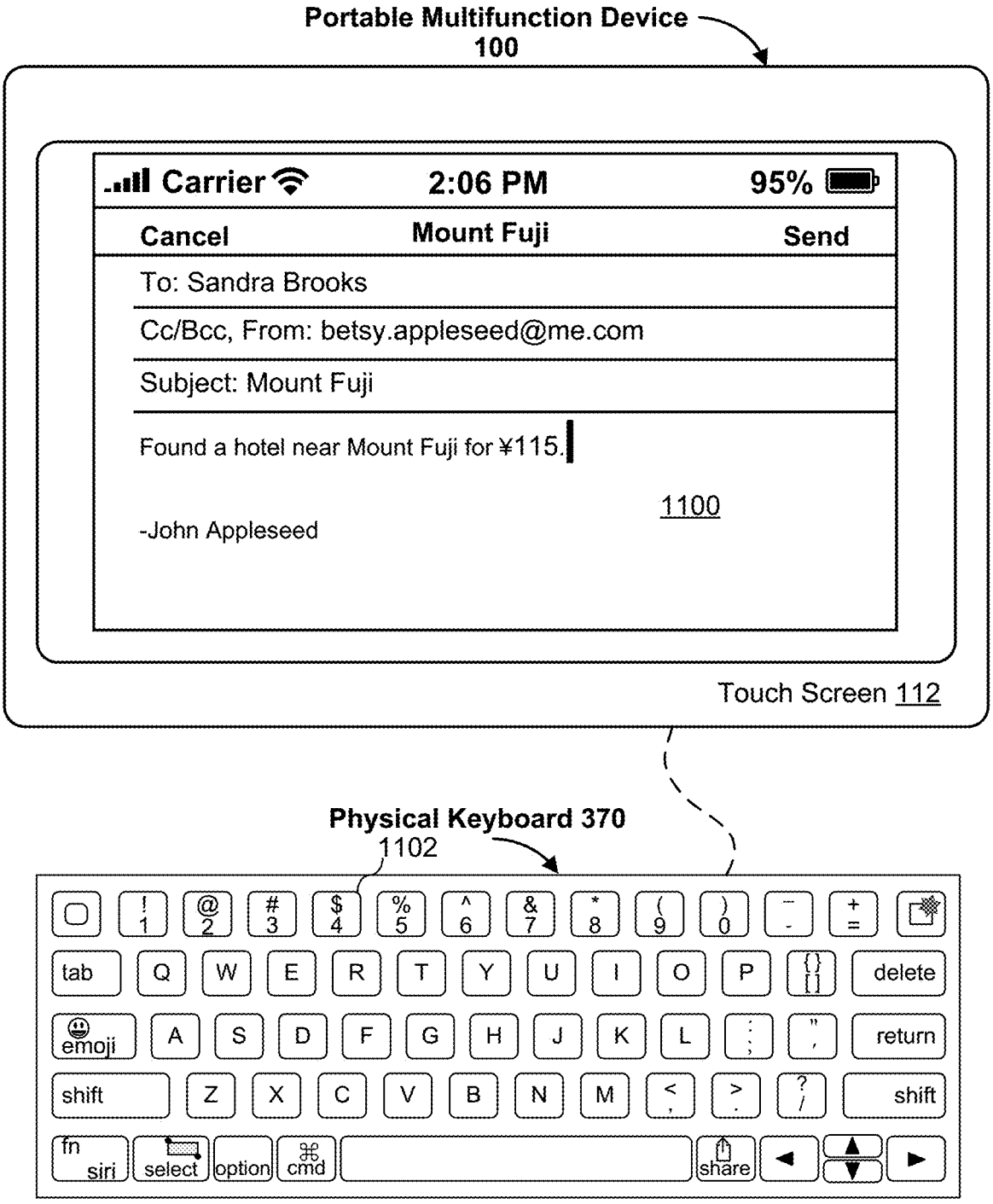

Portable Multifunction Device
100
Carrier
2:06 PM
95%
Cancel
Mount Fuji
Send
To: Sandra Brooks
Cc/Bcc, From: betsy.appleseed@me.com
Subject: Mount Fuji
Found a hotel near Mount Fuji for ¥115.
1100
-John Appleseed
Touch Screen 112
Physical Keyboard 370
1102
tab
delete
emoji
return
shift
shift
fn
siri
select
option
cmd
share

Figure 11F

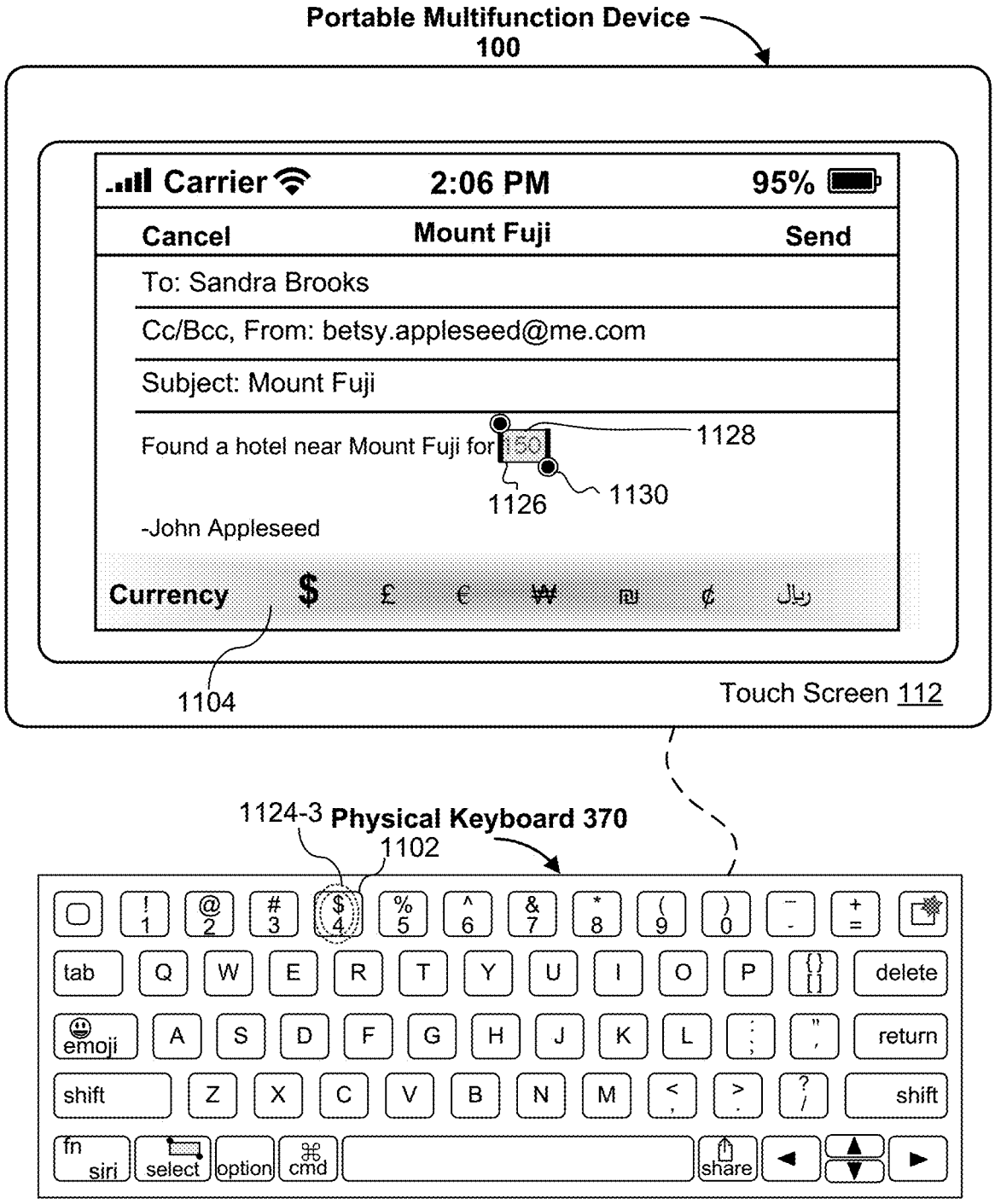

Portable Multifunction Device
100
Carrier
2:06 PM
95%
Cancel
Mount Fuji
Send
To: Sandra Brooks
Cc/Bcc, From: betsy.appleseed@me.com
Subject: Mount Fuji
Found a hotel near Mount Fuji for 150
1128
1126
1130
-John Appleseed
Currency
$
£
€
₩
₪
¢
ريال
1104
Touch Screen 112
1124-3 Physical Keyboard 370
1102
tab
delete
emoji
return
shift
shift
fn
siri
select
option
cmd
share

Figure 11G

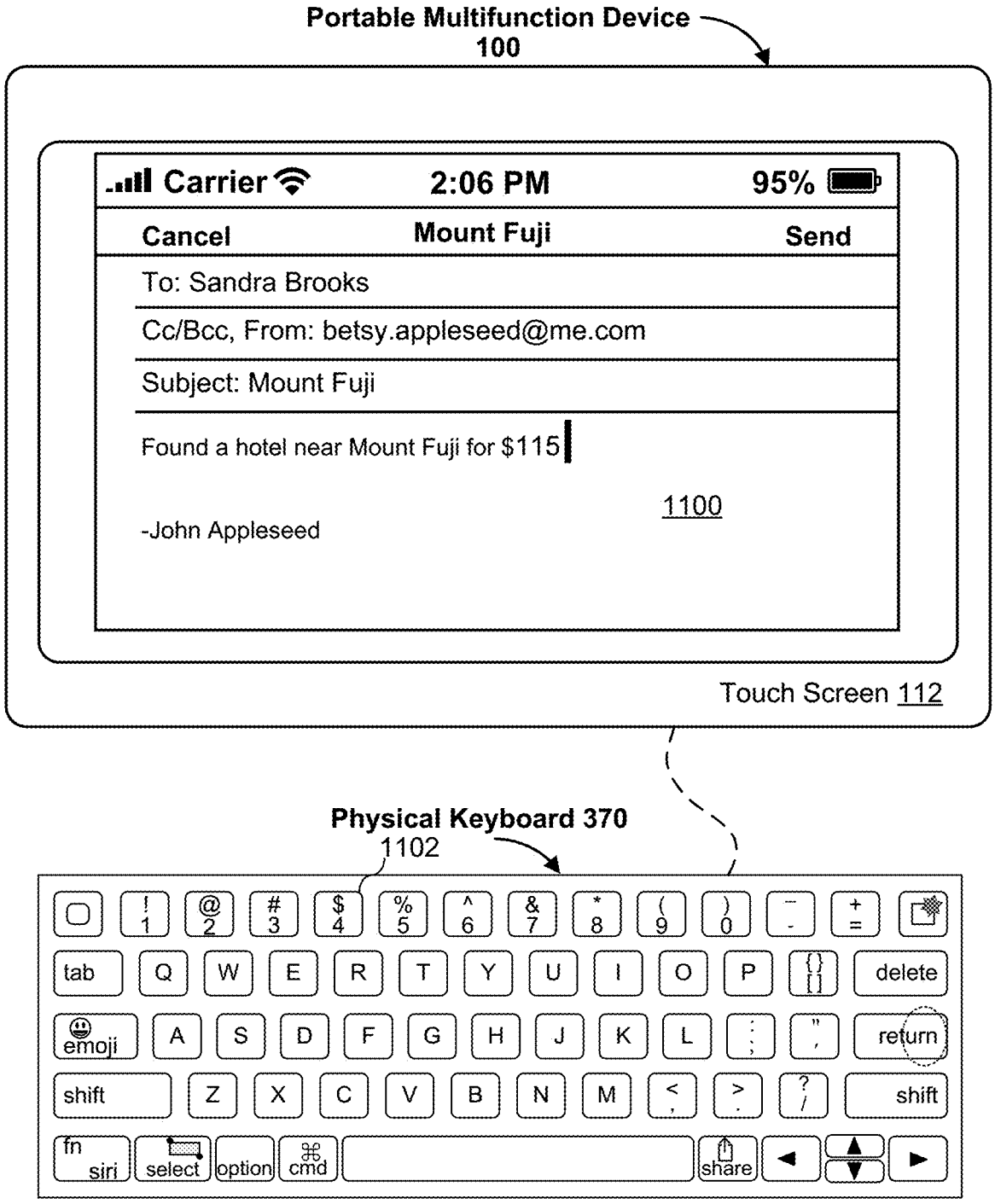

Portable Multifunction Device
100
Carrier
2:06 PM
95%
Cancel
Mount Fuji
Send
To: Sandra Brooks
Cc/Bcc, From: betsy.appleseed@me.com
Subject: Mount Fuji
Found a hotel near Mount Fuji for $115
1100
-John Appleseed
Touch Screen 112
Physical Keyboard 370
1102
tab
delete
emoji
return
shift
shift
fn
siri
select
option
cmd
share

Figure 11H

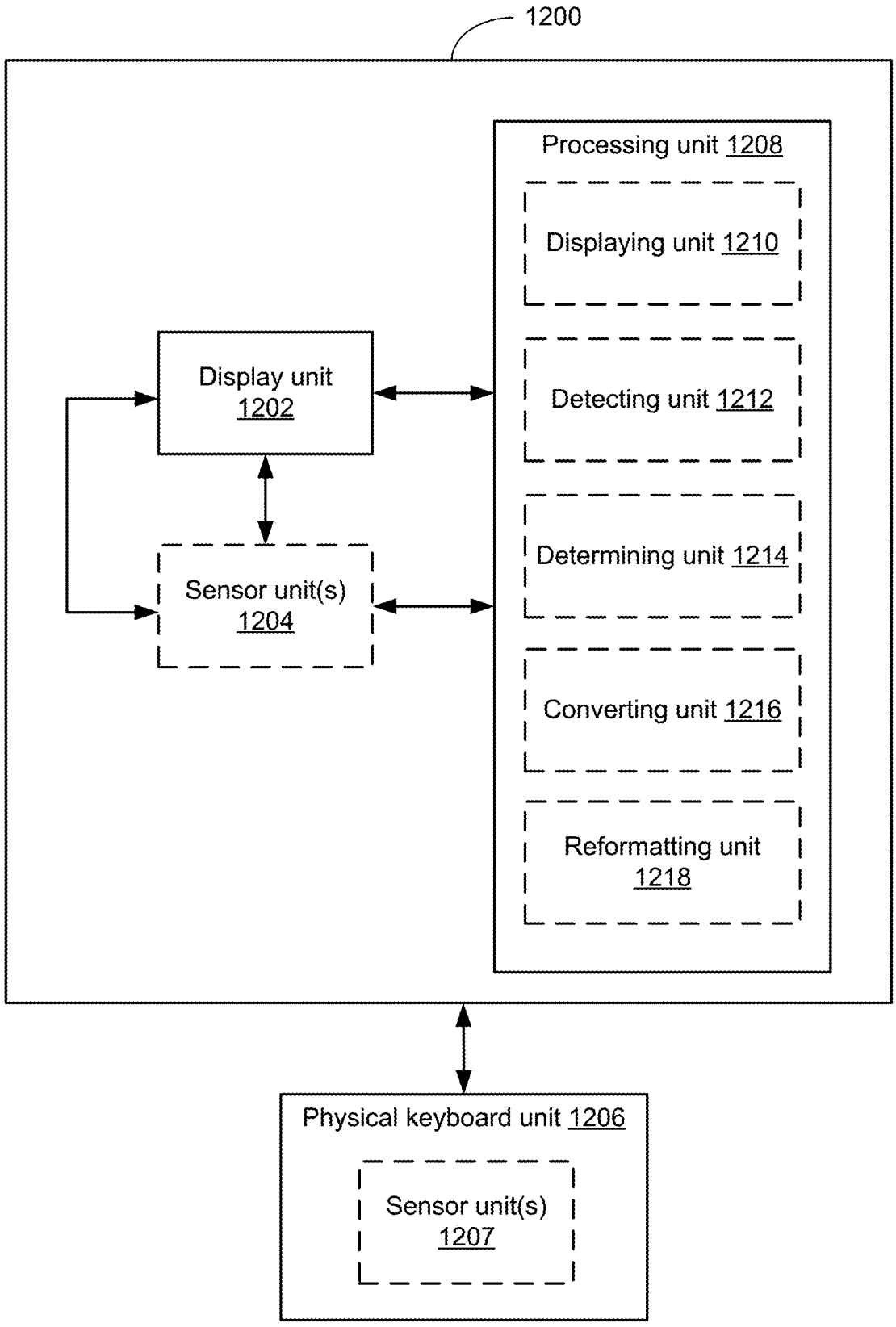

1200
Processing unit 1208
Displaying unit 1210
Display unit 1202
Detecting unit 1212
Determining unit 1214
Sensor unit(s) 1204
Converting unit 1216
Reformatting unit 1218
Physical keyboard unit 1206
Sensor unit(s) 1207

Figure 12

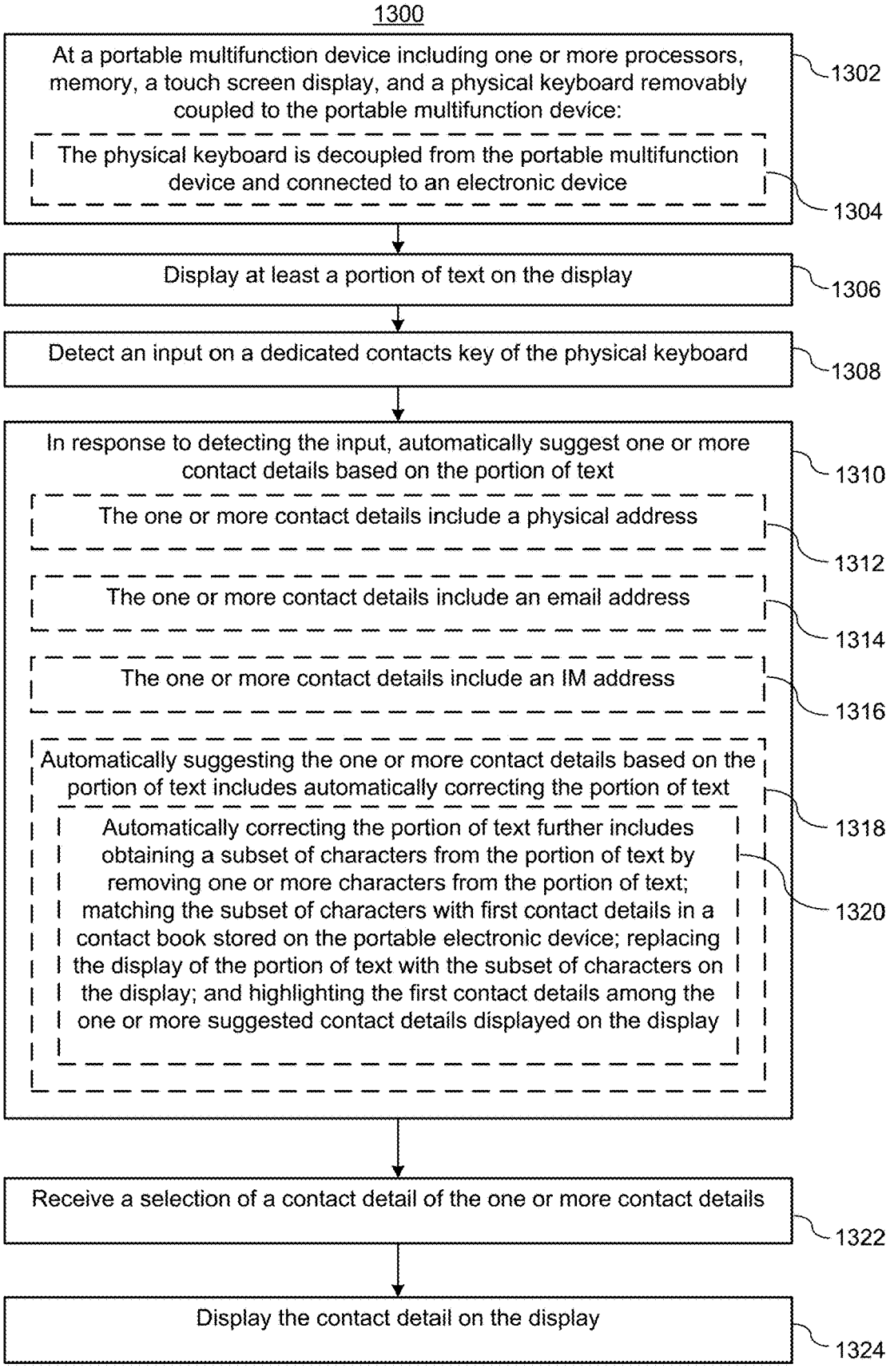

1300
At a portable multifunction device including one or more processors, memory, a touch screen display, and a physical keyboard removably coupled to the portable multifunction device:
1302
The physical keyboard is decoupled from the portable multifunction device and connected to an electronic device
1304
Display at least a portion of text on the display
1306
Detect an input on a dedicated contacts key of the physical keyboard
1308
In response to detecting the input, automatically suggest one or more contact details based on the portion of text
1310
The one or more contact details include a physical address
1312
The one or more contact details include an email address
1314
The one or more contact details include an IM address
1316
Automatically suggesting the one or more contact details based on the portion of text includes automatically correcting the portion of text
1318
Automatically correcting the portion of text further includes obtaining a subset of characters from the portion of text by removing one or more characters from the portion of text; matching the subset of characters with first contact details in a contact book stored on the portable electronic device; replacing the display of the portion of text with the subset of characters on the display; and highlighting the first contact details among the one or more suggested contact details displayed on the display
1320
Receive a selection of a contact detail of the one or more contact details
1322
Display the contact detail on the display
1324

Figure 13

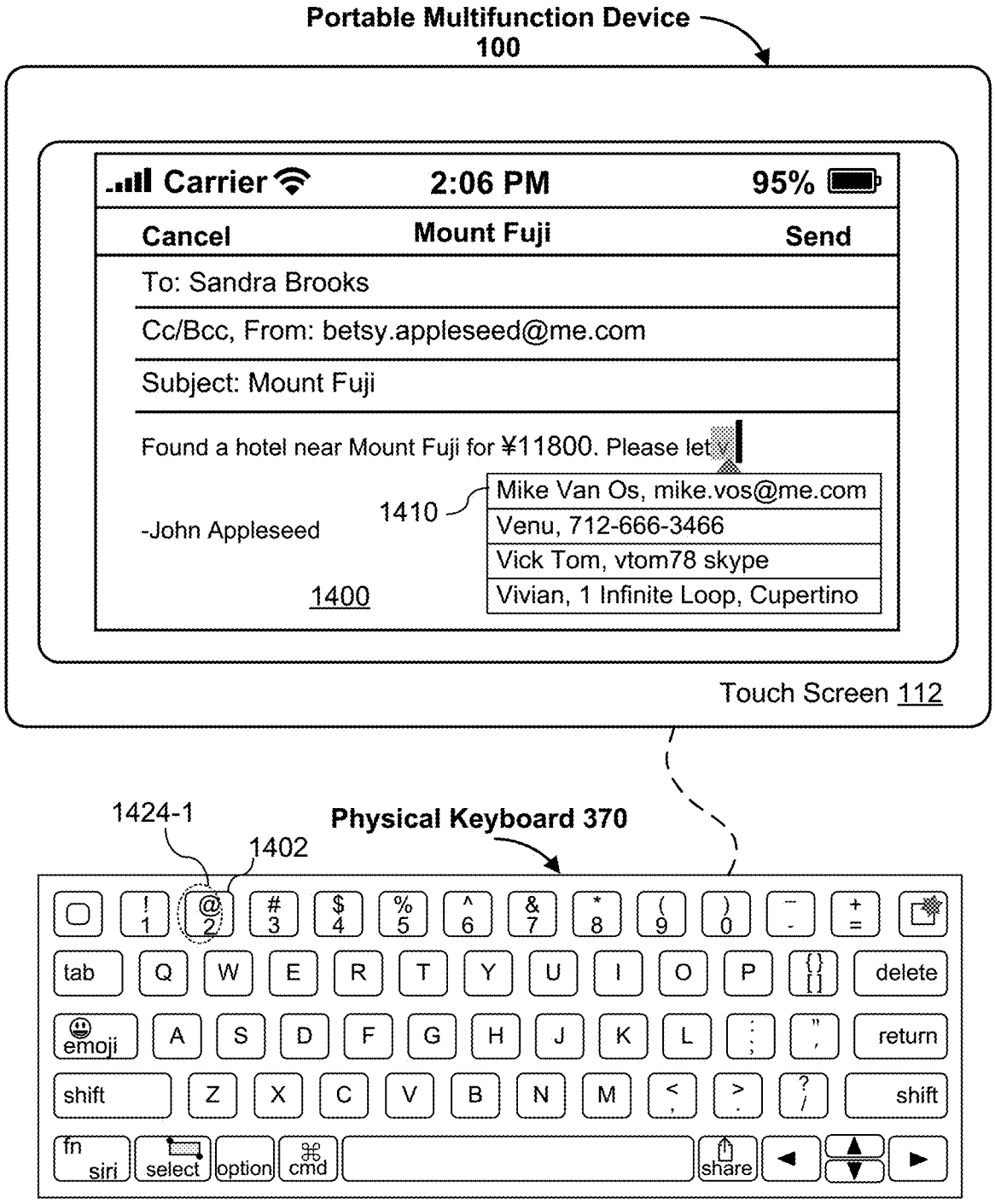

Portable Multifunction Device
100
Carrier
2:06 PM
95%
Cancel
Mount Fuji
Send
To: Sandra Brooks
Cc/Bcc, From: betsy.appleseed@me.com
Subject: Mount Fuji
Found a hotel near Mount Fuji for ¥11800. Please let
-John Appleseed
1410
Mike Van Os, mike.vos@me.com
Venu, 712-666-3466
Vick Tom, vtom78 skype
Vivian, 1 Infinite Loop, Cupertino
1400
Touch Screen 112
1424-1
1402
Physical Keyboard 370
tab
delete
emoji
return
shift
shift
fn
siri
select
option
cmd
share

Figure 14A

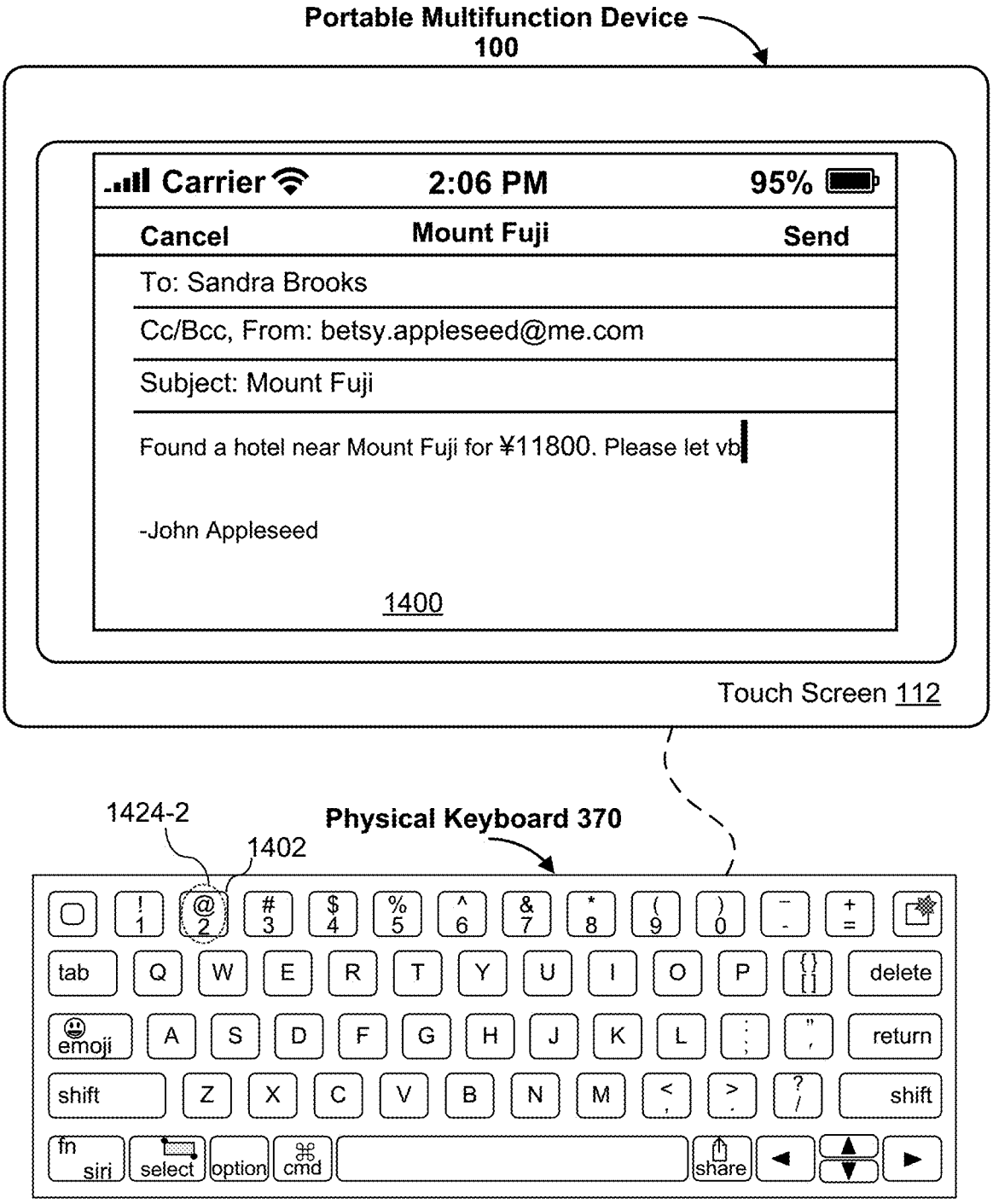

Portable Multifunction Device
100
Carrier
2:06 PM
95%
Cancel
Mount Fuji
Send
To: Sandra Brooks
Cc/Bcc, From: betsy.appleseed@me.com
Subject: Mount Fuji
Found a hotel near Mount Fuji for ¥11800. Please let vb
-John Appleseed
1400
Touch Screen 112
1424-2
1402
Physical Keyboard 370
tab
delete
emoji
return
shift
shift
fn
siri
select
option
cmd
share

Figure 14B

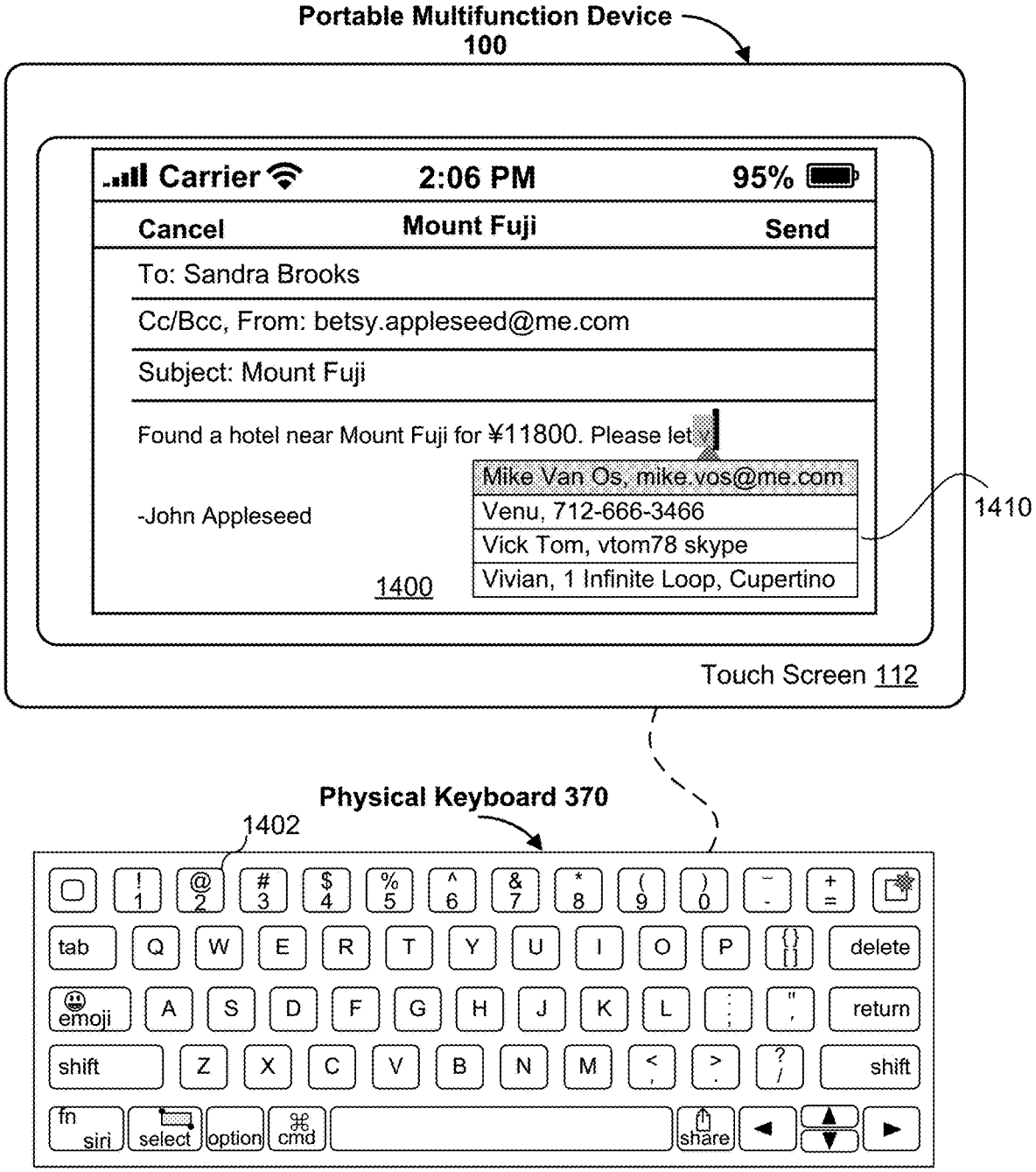

Portable Multifunction Device
100
Carrier
2:06 PM
95%
Cancel
Mount Fuji
Send
To: Sandra Brooks
Cc/Bcc, From: betsy.appleseed@me.com
Subject: Mount Fuji
Found a hotel near Mount Fuji for ¥11800. Please let
-John Appleseed
1400
Mike Van Os, mike.vos@me.com
Venu, 712-666-3466
Vick Tom, vtom78 skype
Vivian, 1 Infinite Loop, Cupertino
1410
Touch Screen 112
Physical Keyboard 370
1402
tab
delete
emoji
return
shift
shift
fn
siri
select
option
cmd
share

Figure 14C

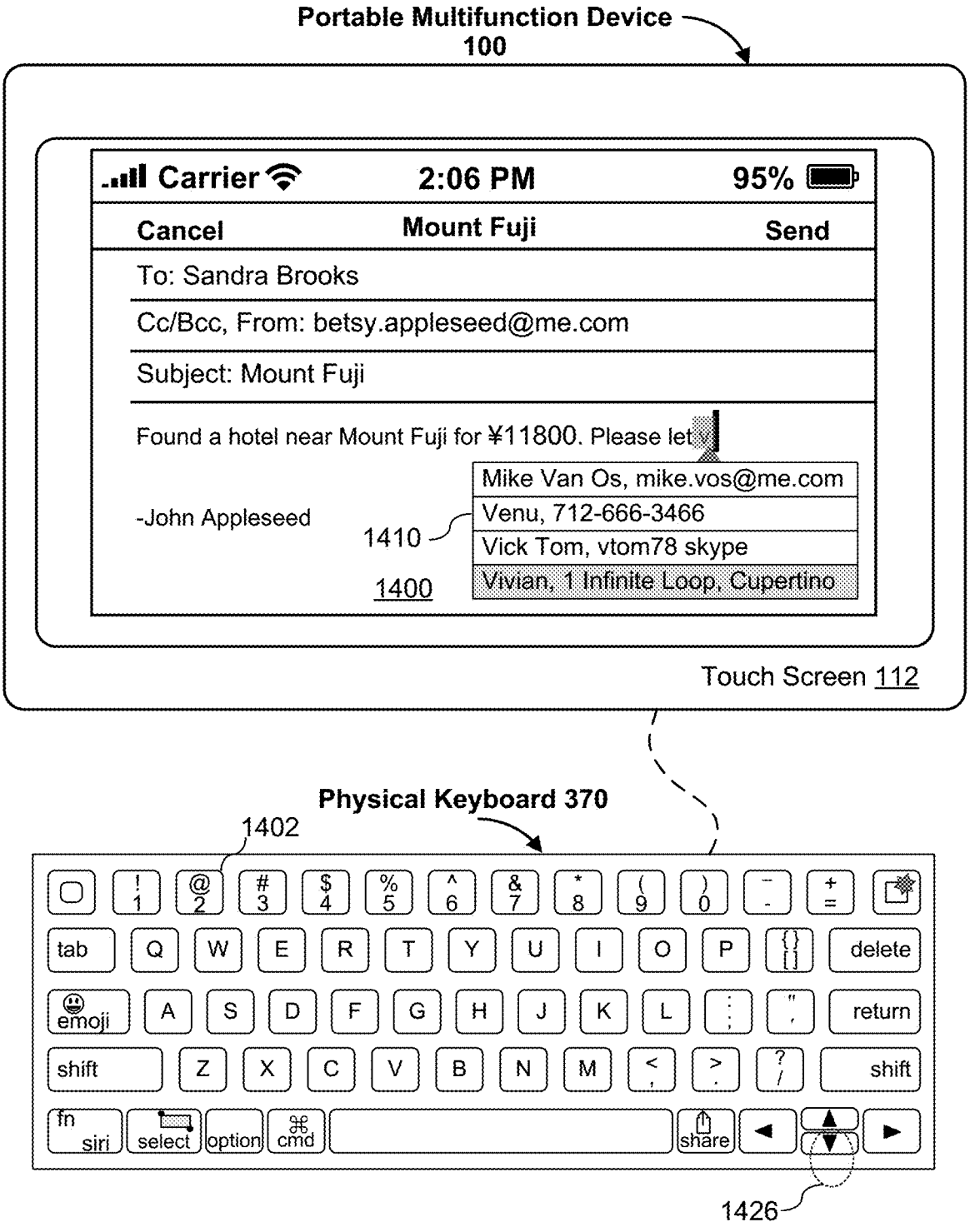

Portable Multifunction Device
100
Carrier
2:06 PM
95%
Cancel
Mount Fuji
Send
To: Sandra Brooks
Cc/Bcc, From: betsy.appleseed@me.com
Subject: Mount Fuji
Found a hotel near Mount Fuji for ¥11800. Please let
-John Appleseed
1410
1400
Mike Van Os, mike.vos@me.com
Venu, 712-666-3466
Vick Tom, vtom78 skype
Vivian, 1 Infinite Loop, Cupertino
Touch Screen 112
Physical Keyboard 370
1402
tab
delete
emoji
return
shift
shift
fn
siri
select
option
cmd
share
1426

Figure 14D

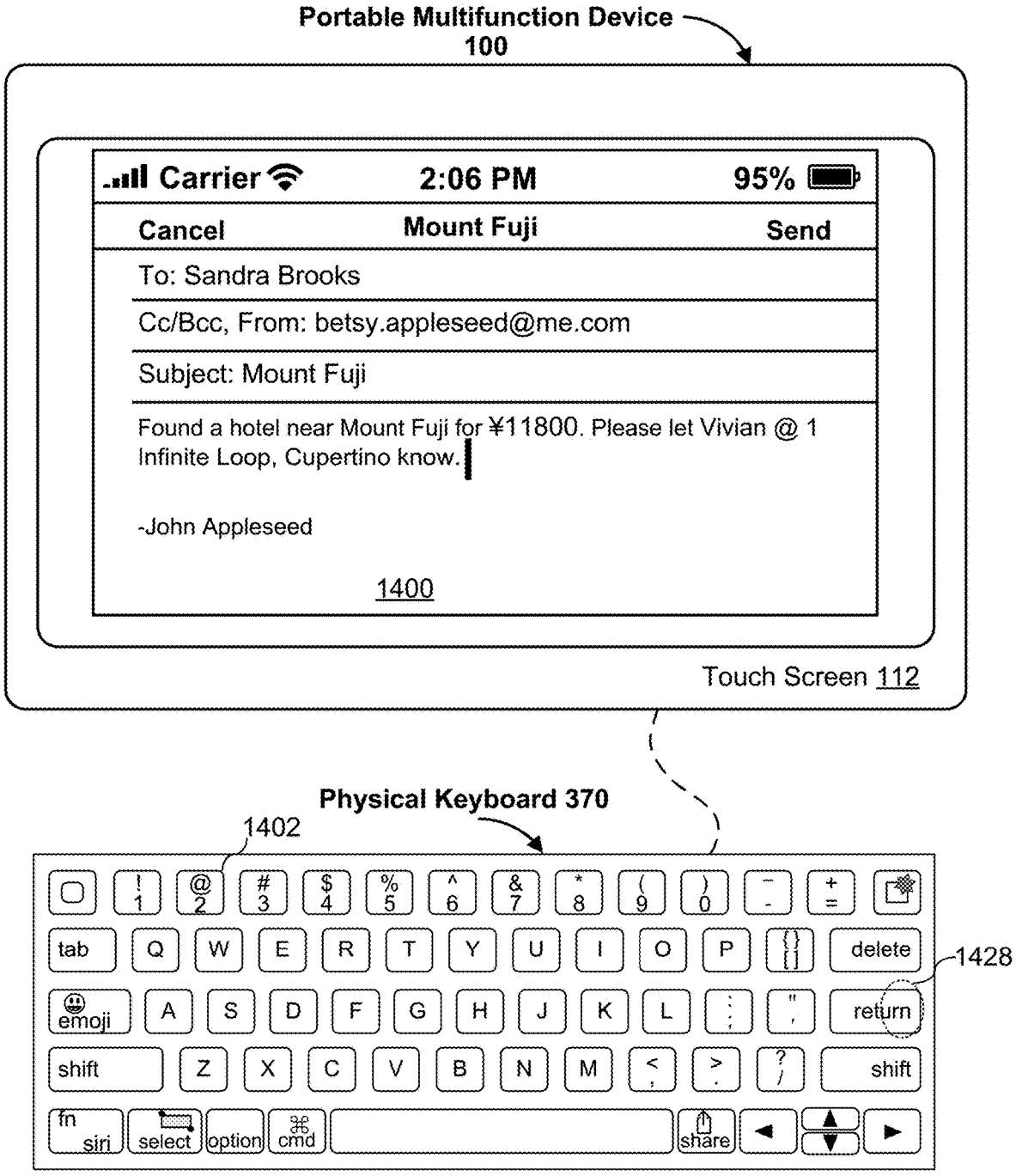

Portable Multifunction Device
100
Carrier
2:06 PM
95%
Cancel
Mount Fuji
Send
To: Sandra Brooks
Cc/Bcc, From: betsy.appleseed@me.com
Subject: Mount Fuji
Found a hotel near Mount Fuji for ¥11800. Please let Vivian @ 1 Infinite Loop, Cupertino know.
-John Appleseed
1400
Touch Screen 112
Physical Keyboard 370
1402
1428
tab
delete
emoji
return
shift
shift
fn
siri
select
option
cmd
share

Figure 14E

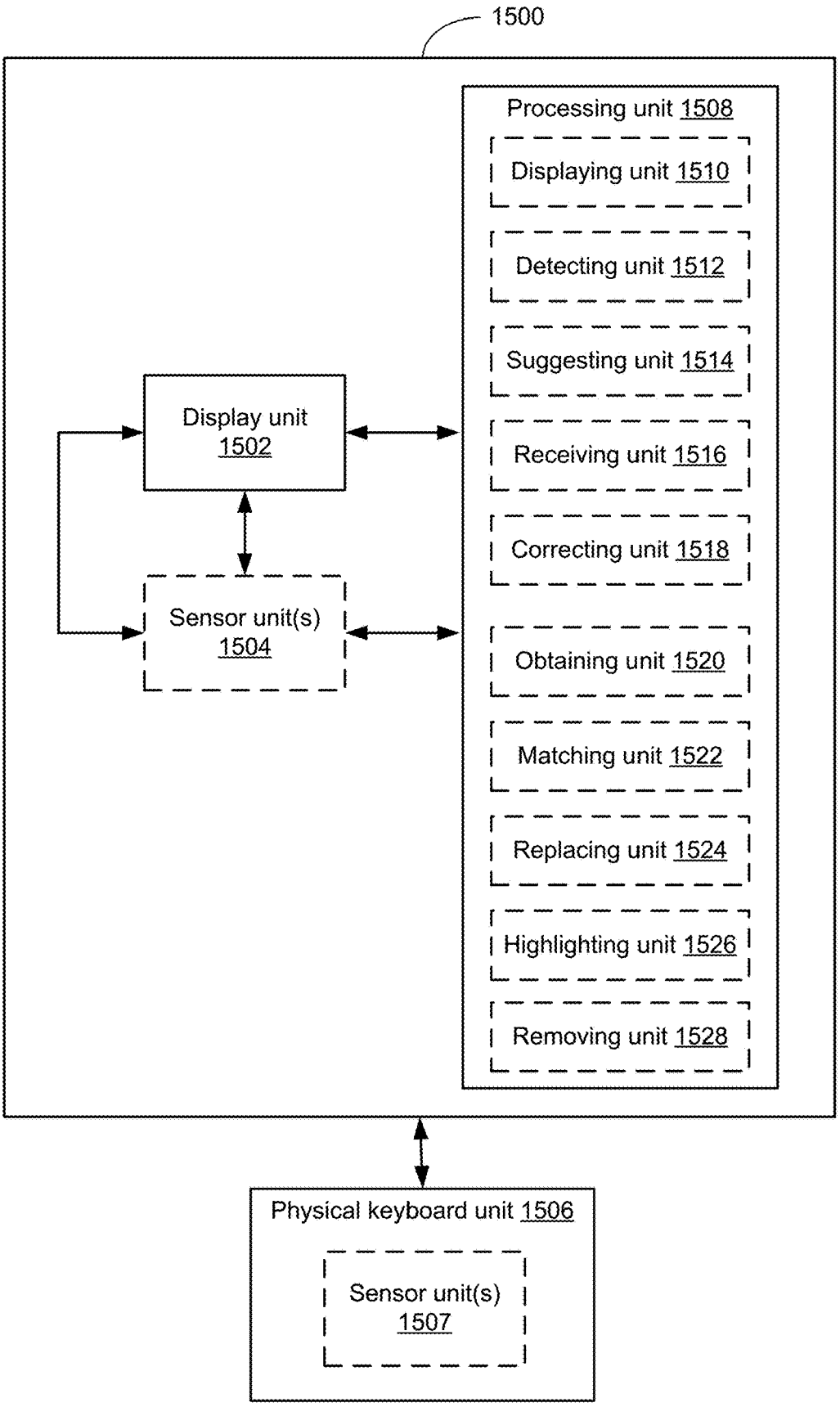

1500
Processing unit 1508
Displaying unit 1510
Detecting unit 1512
Suggesting unit 1514
Receiving unit 1516
Correcting unit 1518
Obtaining unit 1520
Matching unit 1522
Replacing unit 1524
Highlighting unit 1526
Removing unit 1528
Display unit 1502
Sensor unit(s) 1504
Physical keyboard unit 1506
Sensor unit(s) 1507

Figure 15

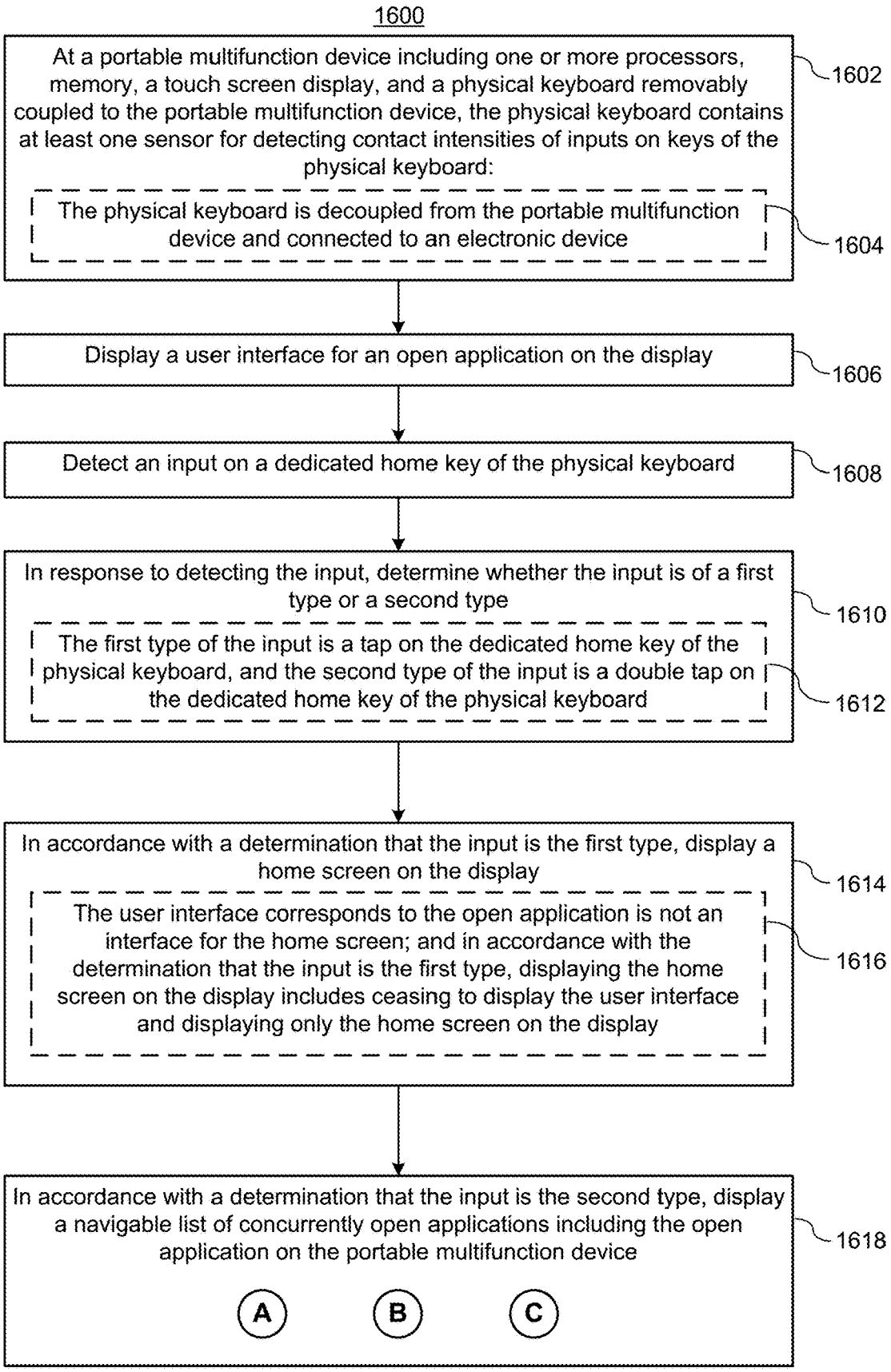

1600
At a portable multifunction device including one or more processors, memory, a touch screen display, and a physical keyboard removably coupled to the portable multifunction device, the physical keyboard contains at least one sensor for detecting contact intensities of inputs on keys of the physical keyboard:
1602
The physical keyboard is decoupled from the portable multifunction device and connected to an electronic device
1604
Display a user interface for an open application on the display
1606
Detect an input on a dedicated home key of the physical keyboard
1608
In response to detecting the input, determine whether the input is of a first type or a second type
1610
The first type of the input is a tap on the dedicated home key of the physical keyboard, and the second type of the input is a double tap on the dedicated home key of the physical keyboard
1612
In accordance with a determination that the input is the first type, display a home screen on the display
1614
The user interface corresponds to the open application is not an interface for the home screen; and in accordance with the determination that the input is the first type, displaying the home screen on the display includes ceasing to display the user interface and displaying only the home screen on the display
1616
In accordance with a determination that the input is the second type, display a navigable list of concurrently open applications including the open application on the portable multifunction device
1618
A
B
C

Figure 16A

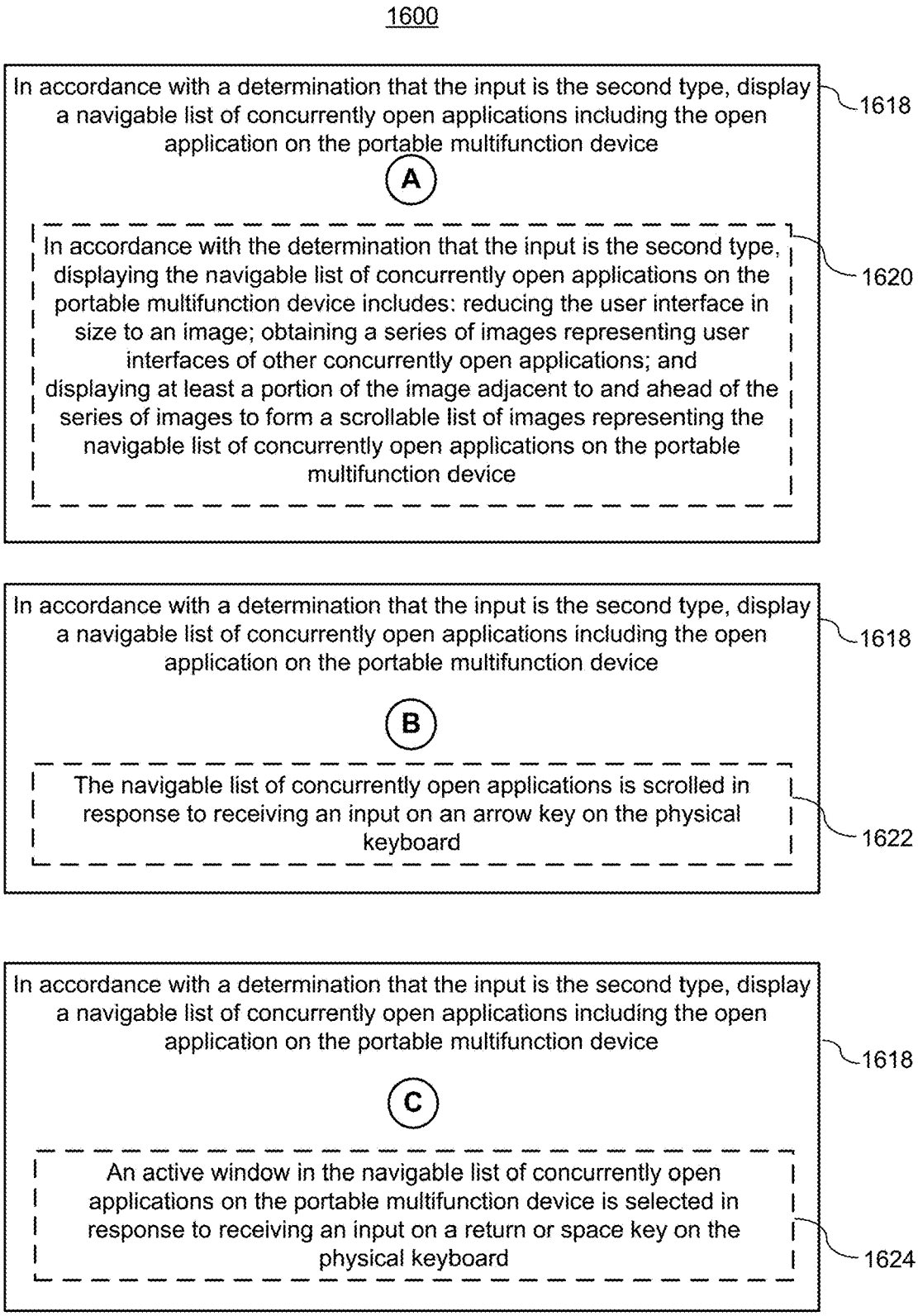

1600
In accordance with a determination that the input is the second type, display a navigable list of concurrently open applications including the open application on the portable multifunction device
1618
A
In accordance with the determination that the input is the second type, displaying the navigable list of concurrently open applications on the portable multifunction device includes: reducing the user interface in size to an image; obtaining a series of images representing user interfaces of other concurrently open applications; and displaying at least a portion of the image adjacent to and ahead of the series of images to form a scrollable list of images representing the navigable list of concurrently open applications on the portable multifunction device
1620
In accordance with a determination that the input is the second type, display a navigable list of concurrently open applications including the open application on the portable multifunction device
1618
B
The navigable list of concurrently open applications is scrolled in response to receiving an input on an arrow key on the physical keyboard
1622
In accordance with a determination that the input is the second type, display a navigable list of concurrently open applications including the open application on the portable multifunction device
1618
C
An active window in the navigable list of concurrently open applications on the portable multifunction device is selected in response to receiving an input on a return or space key on the physical keyboard
1624

Figure 16B

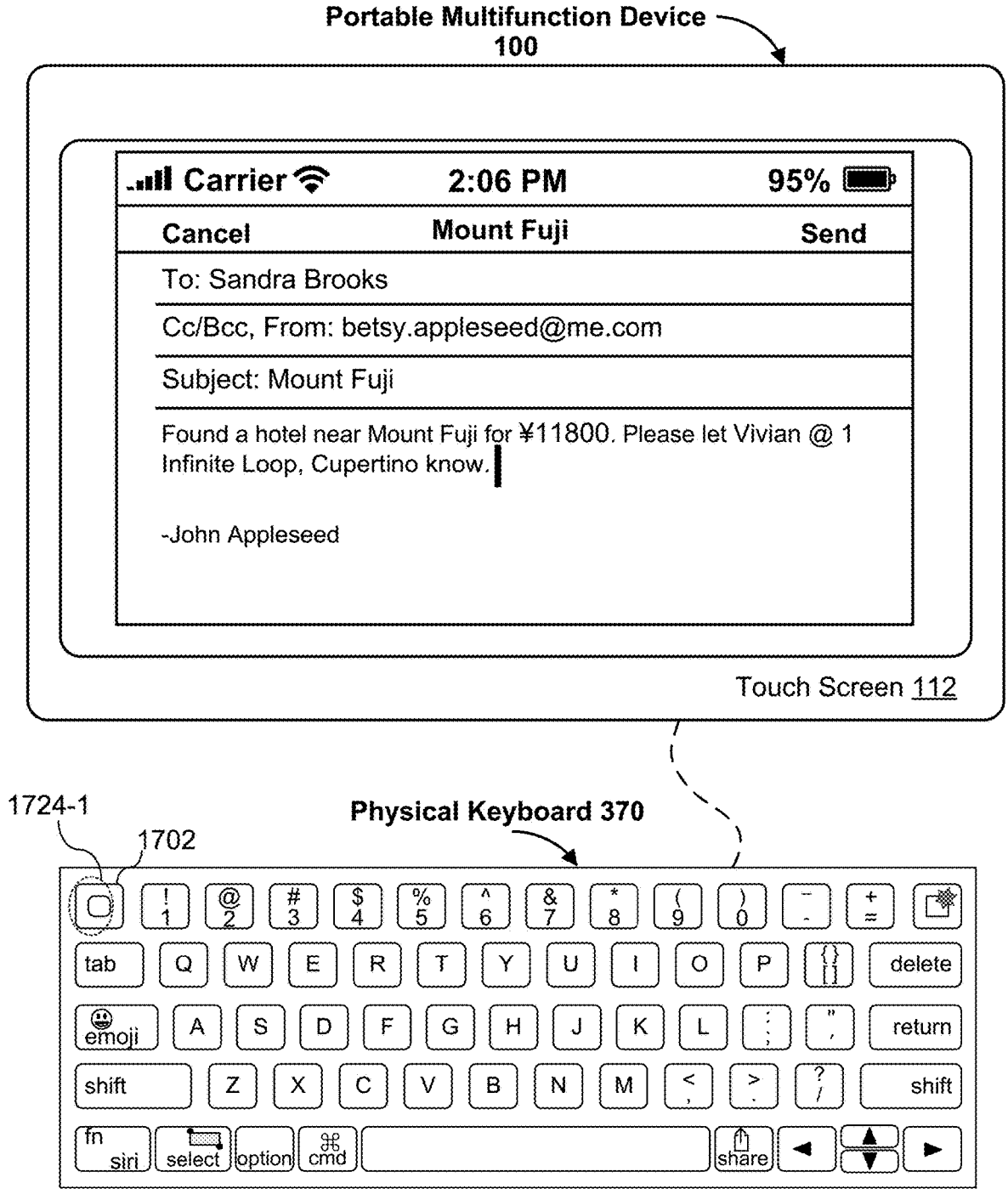

Portable Multifunction Device
100
Carrier
2:06 PM
95%
Cancel
Mount Fuji
Send
To: Sandra Brooks
Cc/Bcc, From: betsy.appleseed@me.com
Subject: Mount Fuji
Found a hotel near Mount Fuji for ¥11800. Please let Vivian @ 1 Infinite Loop, Cupertino know.
-John Appleseed
Touch Screen 112
1724-1
1702
Physical Keyboard 370
tab
delete
emoji
return
shift
shift
fn
siri
select
option
cmd
share

Figure 17A

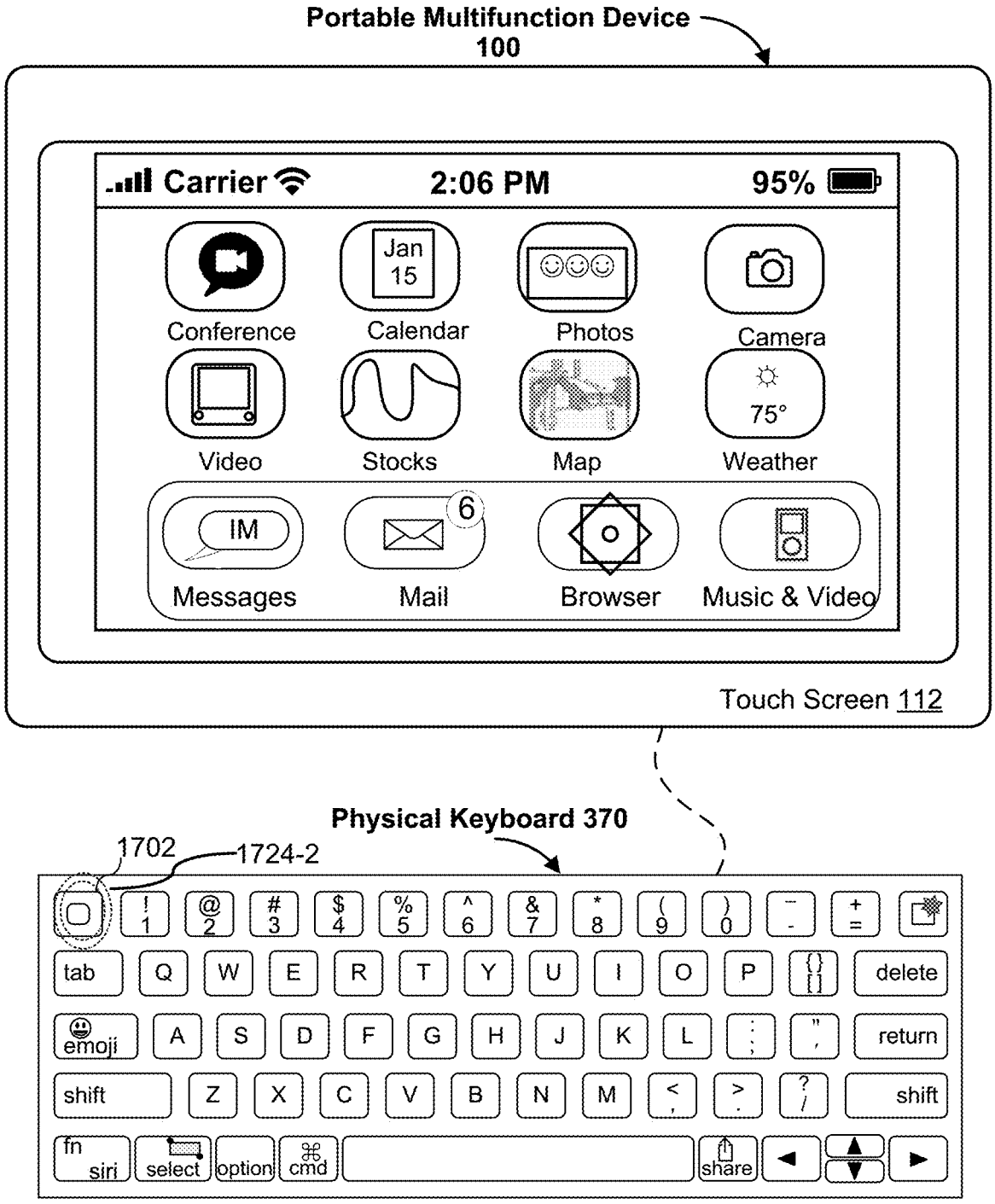

Portable Multifunction Device
100
Carrier
2:06 PM
95%
Conference
Jan
15
Calendar
Photos
Camera
Video
Stocks
Map
75°
Weather
IM
6
Messages
Mail
Browser
Music & Video
Touch Screen 112
Physical Keyboard 370
1702
1724-2
tab
delete
emoji
return
shift
shift
fn
siri
select
option
cmd
share

Figure 17B

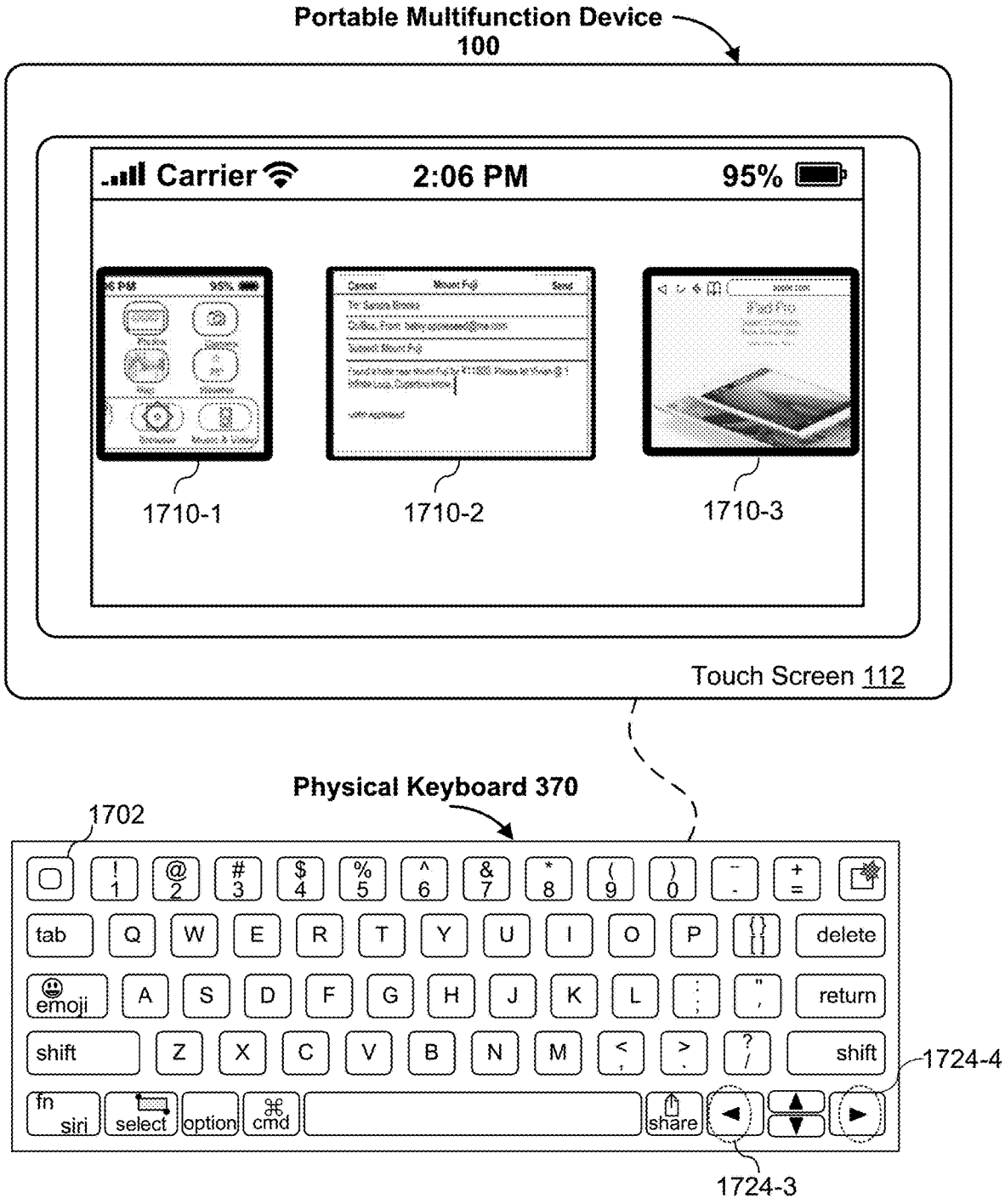

Portable Multifunction Device
100
Carrier
2:06 PM
95%
1710-1
1710-2
1710-3
Touch Screen 112
Physical Keyboard 370
1702
tab
delete
emoji
return
shift
shift
fn
siri
select
option
cmd
share
1724-4
1724-3

Figure 17C

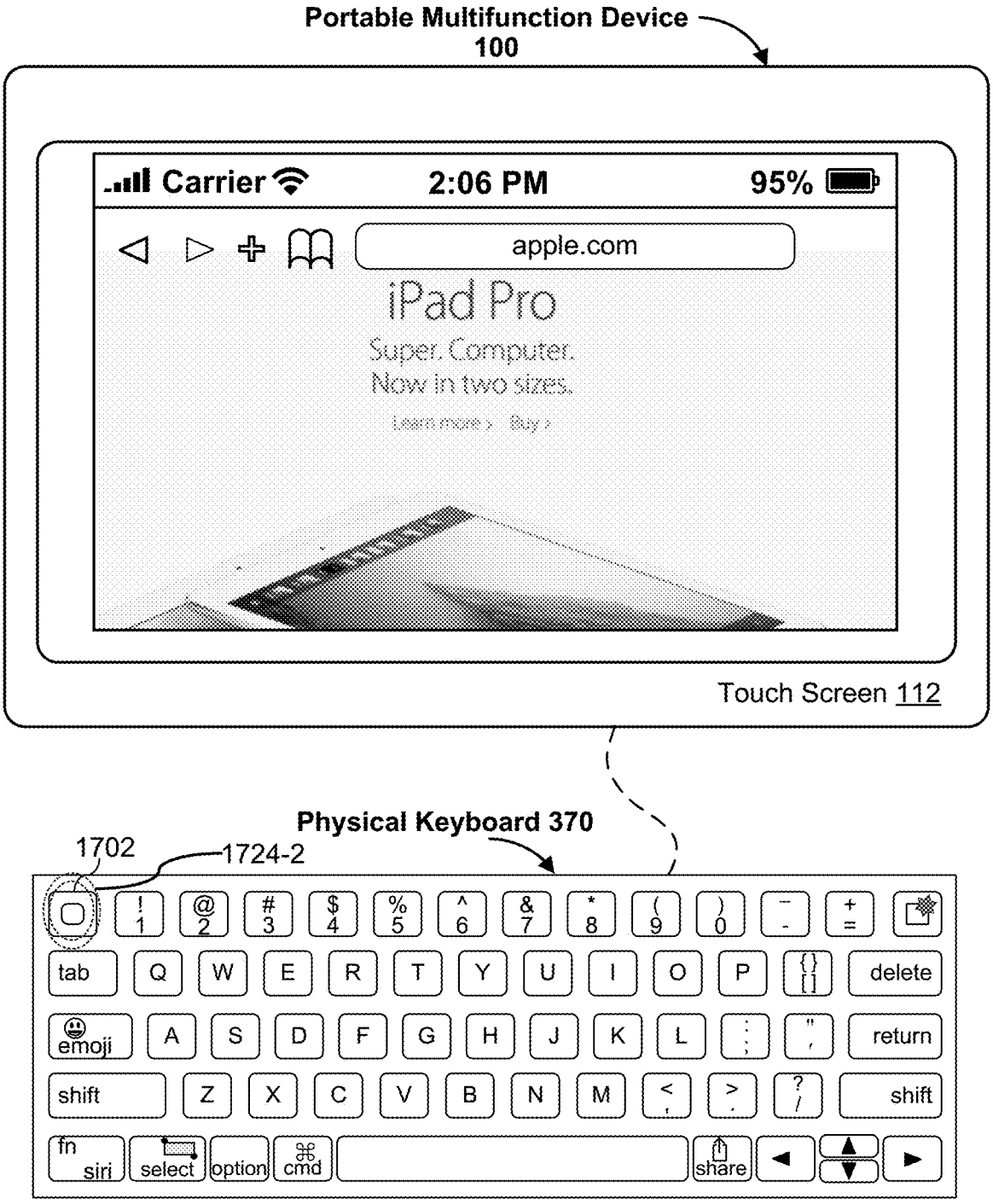

Portable Multifunction Device
100
Carrier
2:06 PM
95%
apple.com
iPad Pro
Super. Computer.
Now in two sizes.
Touch Screen 112
Physical Keyboard 370
1702
1724-2
tab
delete
emoji
return
shift
shift
fn
siri
select
option
cmd
share

Figure 17D

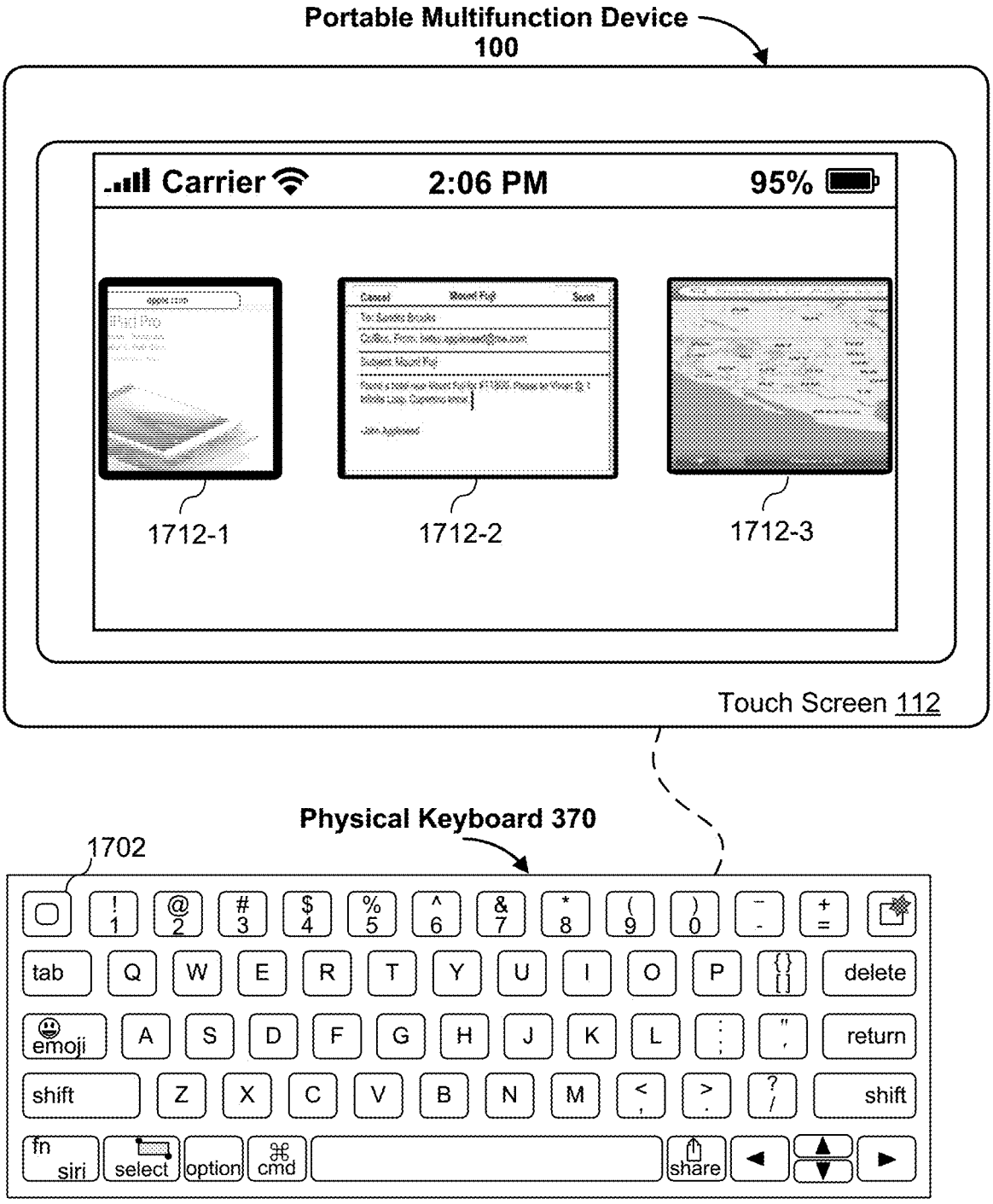

Portable Multifunction Device
100
Carrier
2:06 PM
95%
1712-1
1712-2
1712-3
Touch Screen 112
Physical Keyboard 370
1702
tab
delete
emoji
return
shift
shift
fn
siri
select
option
cmd
share

Figure 17E

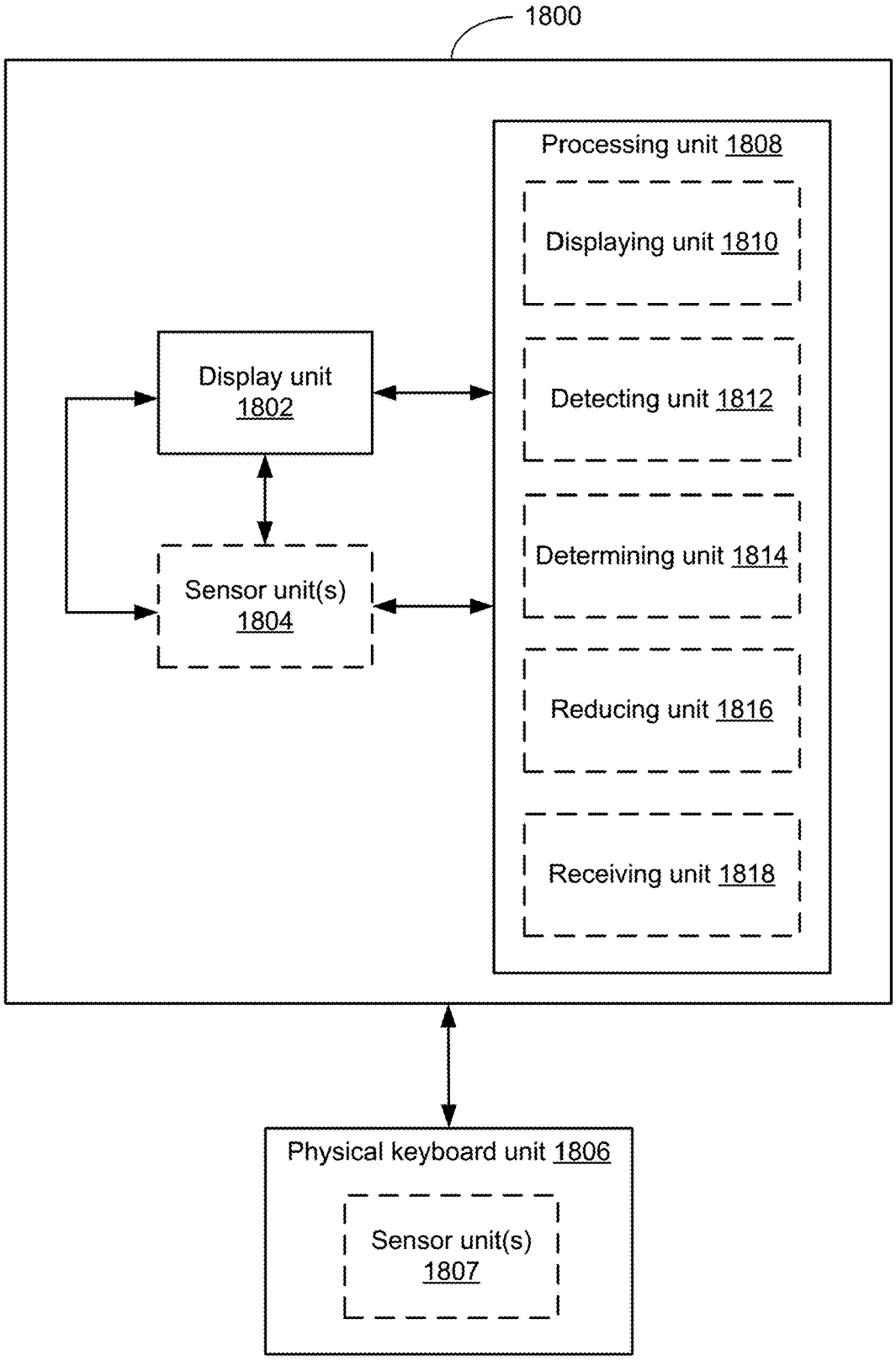

1800
Processing unit 1808
Displaying unit 1810
Detecting unit 1812
Determining unit 1814
Reducing unit 1816
Receiving unit 1818
Display unit 1802
Sensor unit(s) 1804
Physical keyboard unit 1806
Sensor unit(s) 1807

Figure 18

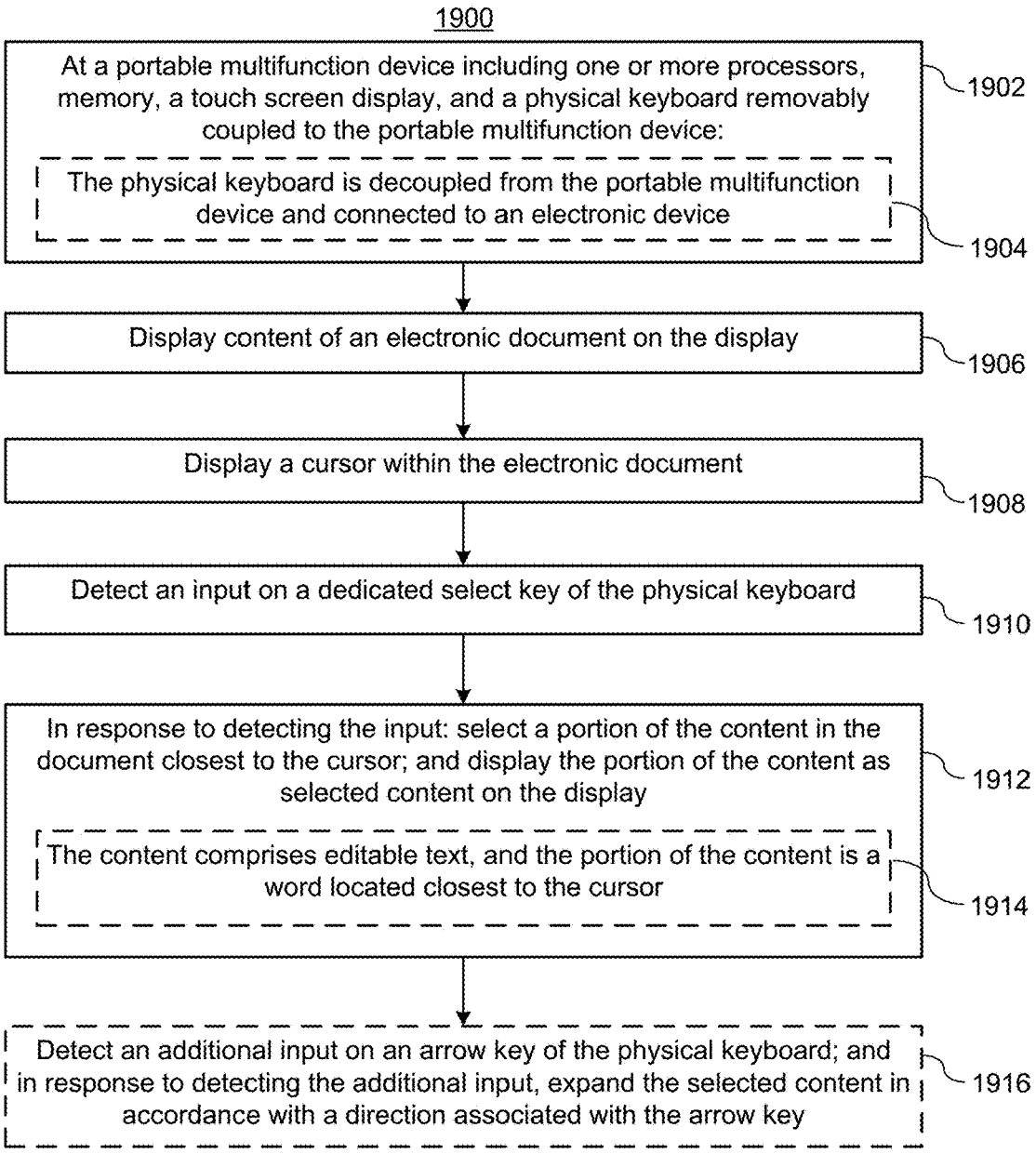

1900
At a portable multifunction device including one or more processors, memory, a touch screen display, and a physical keyboard removably coupled to the portable multifunction device:
1902
The physical keyboard is decoupled from the portable multifunction device and connected to an electronic device
1904
Display content of an electronic document on the display
1906
Display a cursor within the electronic document
1908
Detect an input on a dedicated select key of the physical keyboard
1910
In response to detecting the input: select a portion of the content in the document closest to the cursor; and display the portion of the content as selected content on the display
1912
The content comprises editable text, and the portion of the content is a word located closest to the cursor
1914
Detect an additional input on an arrow key of the physical keyboard; and in response to detecting the additional input, expand the selected content in accordance with a direction associated with the arrow key
1916

Figure 19

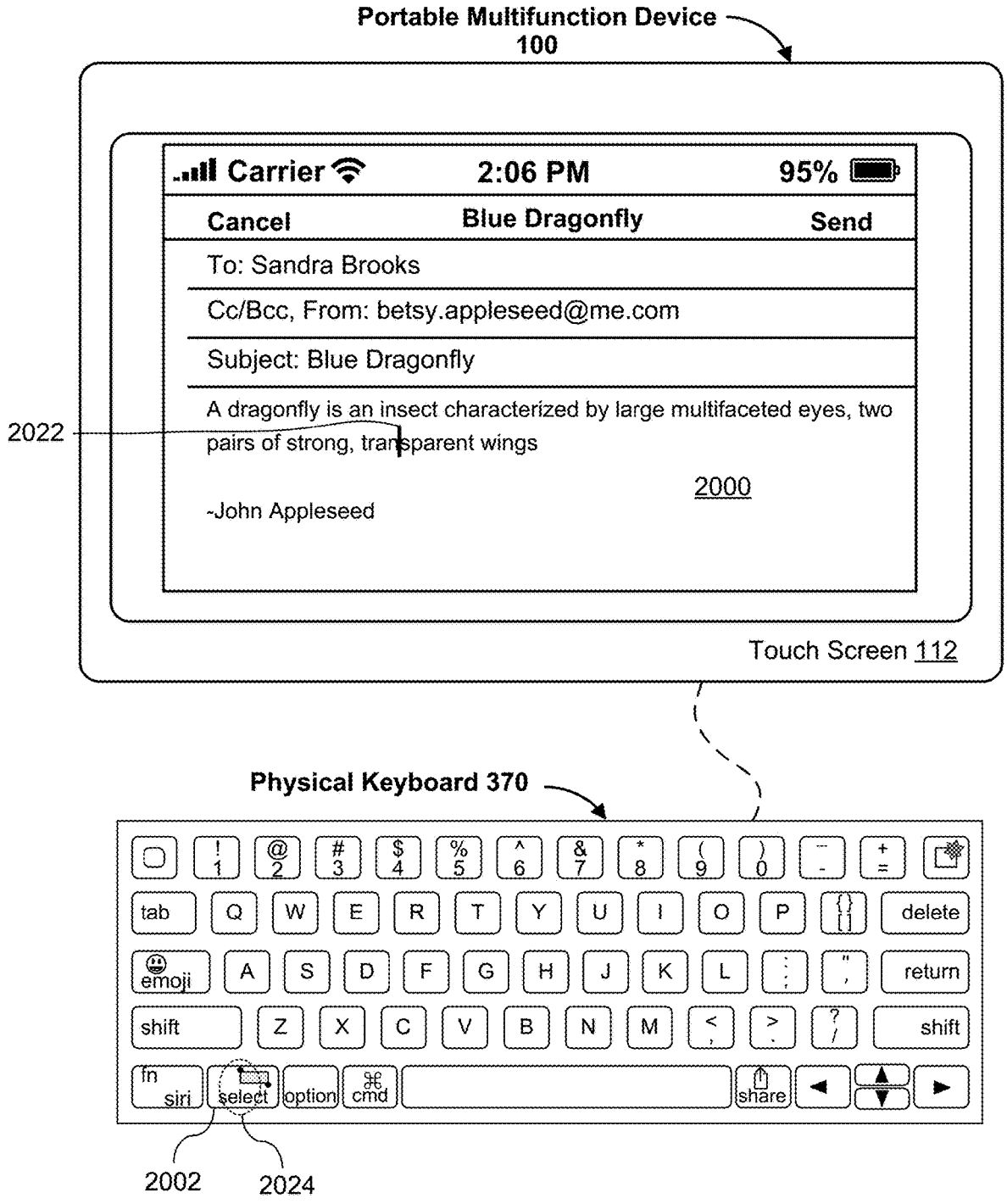

Portable Multifunction Device
100
Carrier
2:06 PM
95%
Cancel
Blue Dragonfly
Send
To: Sandra Brooks
Cc/Bcc, From: betsy.appleseed@me.com
Subject: Blue Dragonfly
A dragonfly is an insect characterized by large multifaceted eyes, two pairs of strong, transparent wings
2000
-John Appleseed
2022
Touch Screen 112
Physical Keyboard 370
tab
delete
emoji
return
shift
shift
fn
siri
select
option
cmd
share
2002
2024

Figure 20A

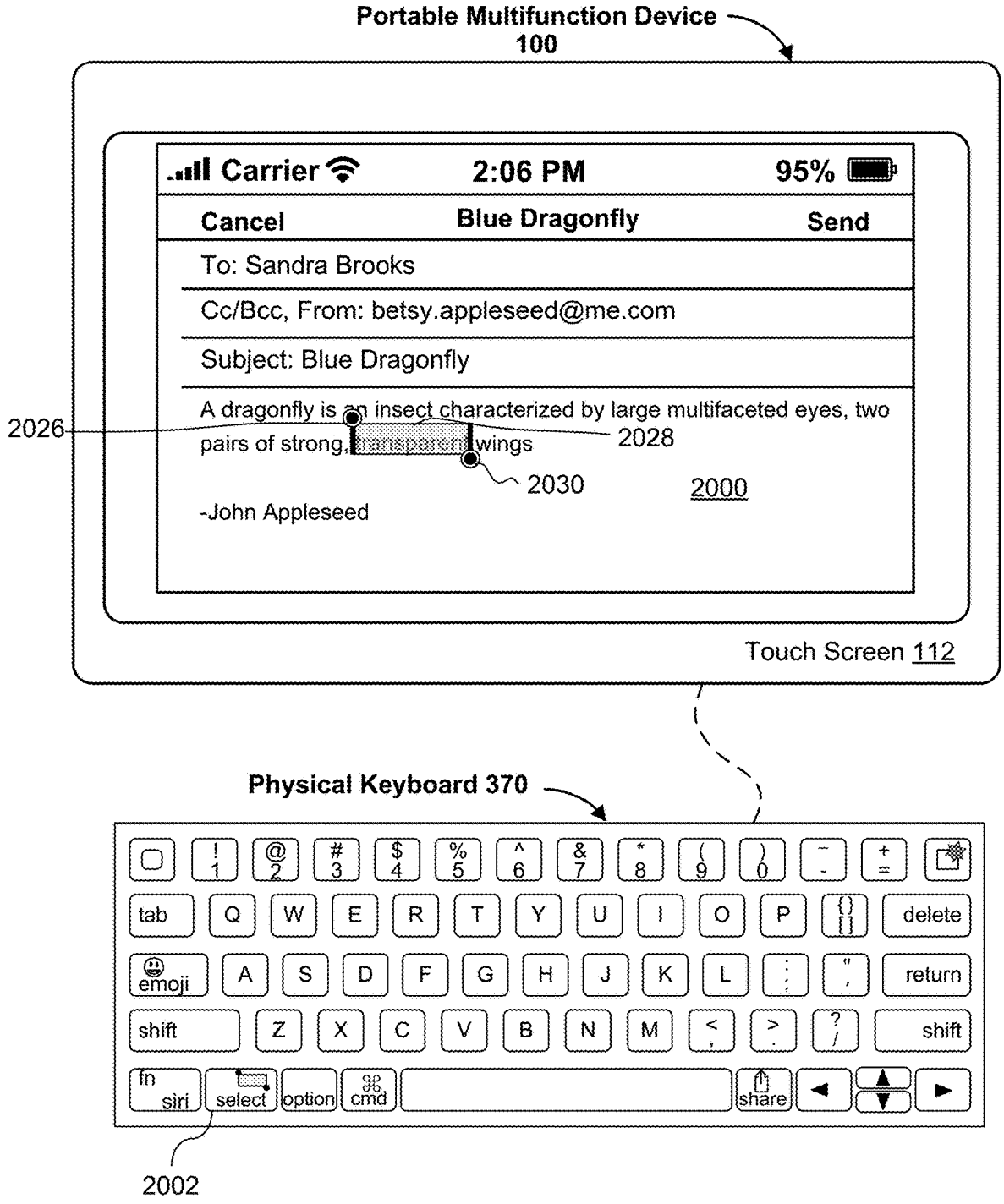

Portable Multifunction Device
100
Carrier
2:06 PM
95%
Cancel
Blue Dragonfly
Send
To: Sandra Brooks
Cc/Bcc, From: betsy.appleseed@me.com
Subject: Blue Dragonfly
A dragonfly is an insect characterized by large multifaceted eyes, two pairs of strong, transparent wings
-John Appleseed
2026
2028
2030
2000
Touch Screen 112
Physical Keyboard 370
tab
delete
emoji
return
shift
shift
fn
siri
select
option
cmd
share
2002

Figure 20B

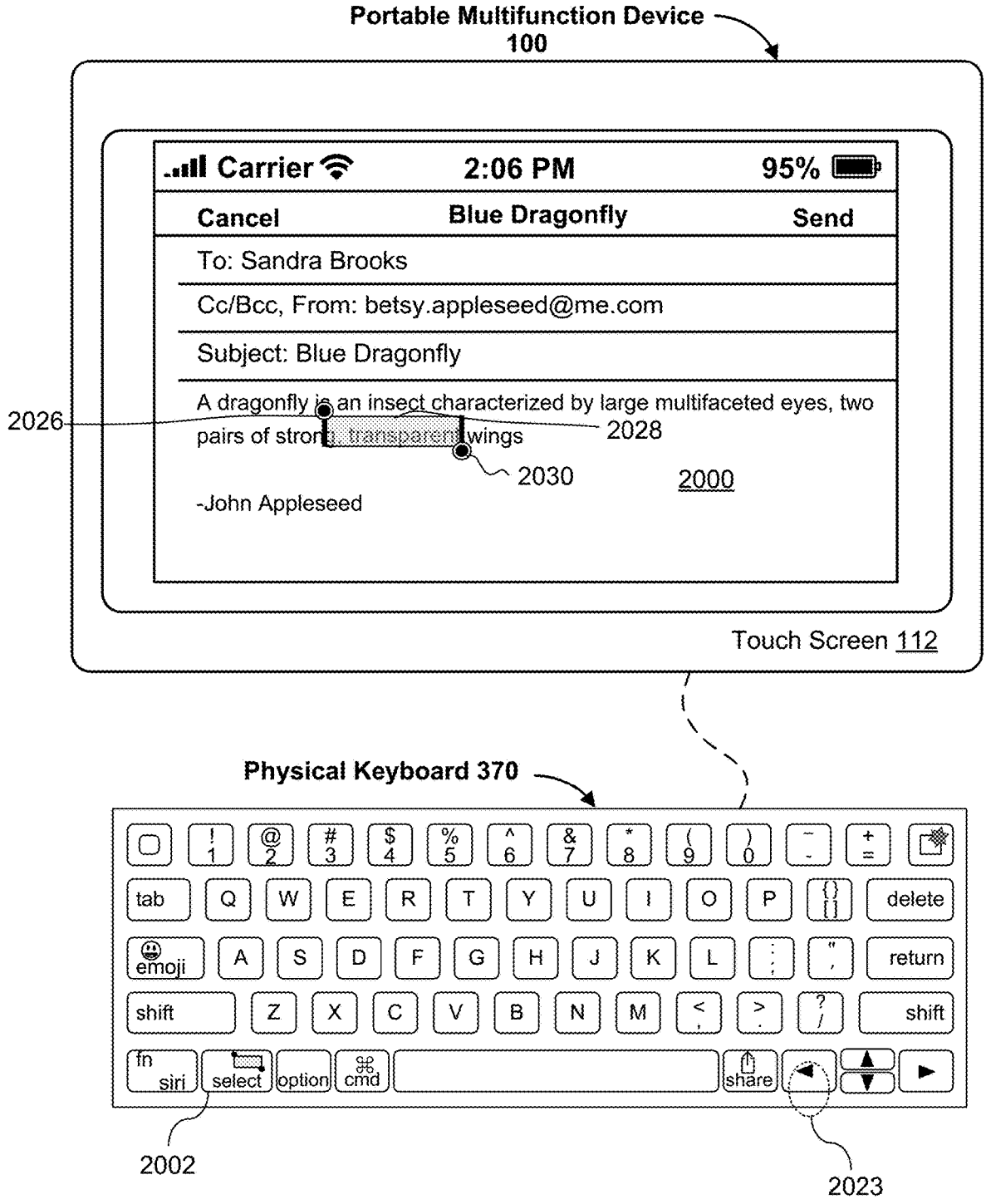

Portable Multifunction Device
100
Carrier
2:06 PM
95%
Cancel
Blue Dragonfly
Send
To: Sandra Brooks
Cc/Bcc, From: betsy.appleseed@me.com
Subject: Blue Dragonfly
A dragonfly is an insect characterized by large multifaceted eyes, two pairs of strong transparent wings
-John Appleseed
2026
2028
2030
2000
Touch Screen 112
Physical Keyboard 370
tab
delete
emoji
return
shift
shift
fn
siri
select
option
cmd
share
2002
2023

Figure 20C

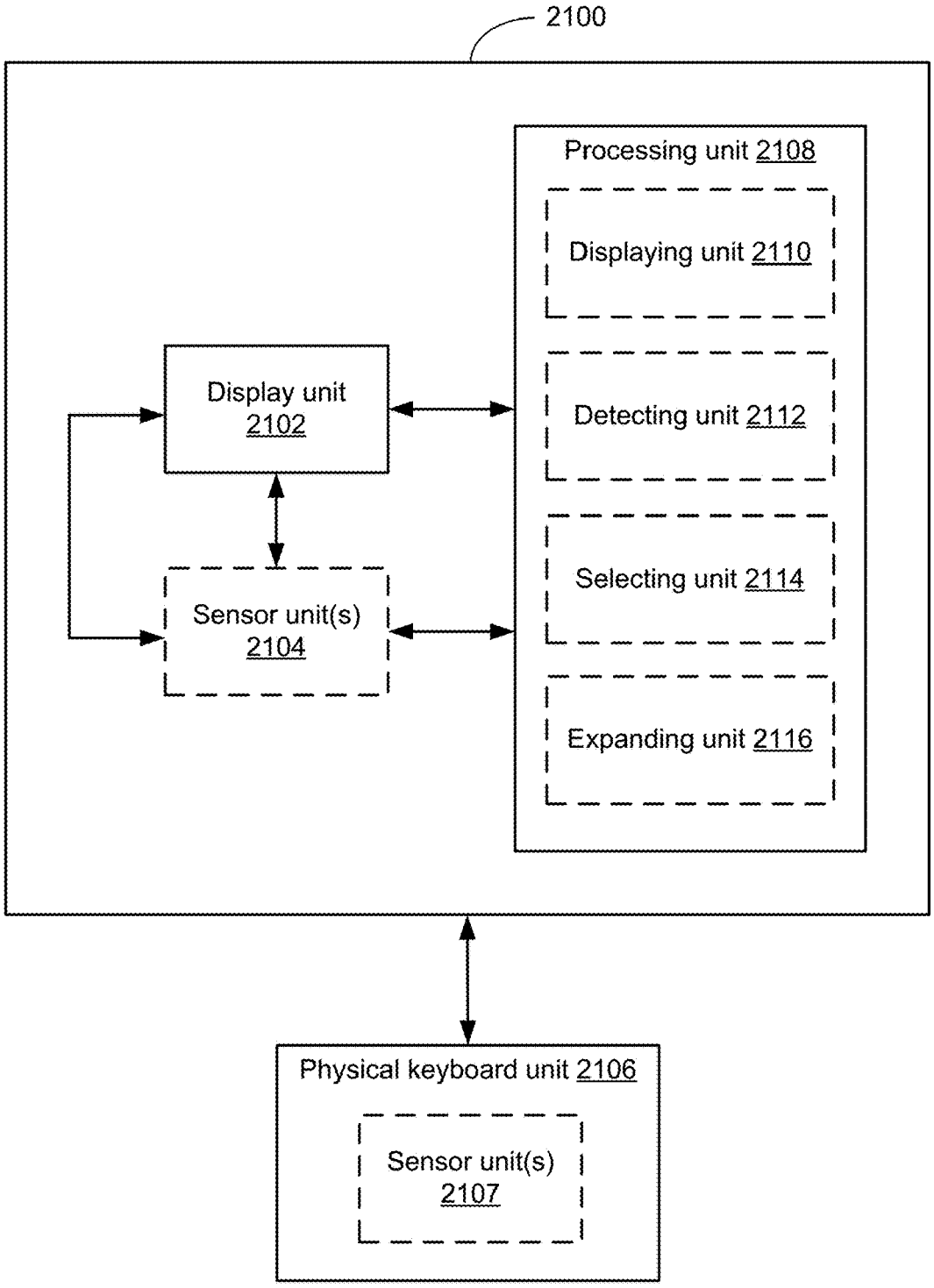

2100
Processing unit 2108
Displaying unit 2110
Detecting unit 2112
Selecting unit 2114
Expanding unit 2116
Display unit 2102
Sensor unit(s) 2104
Physical keyboard unit 2106
Sensor unit(s) 2107

Figure 21

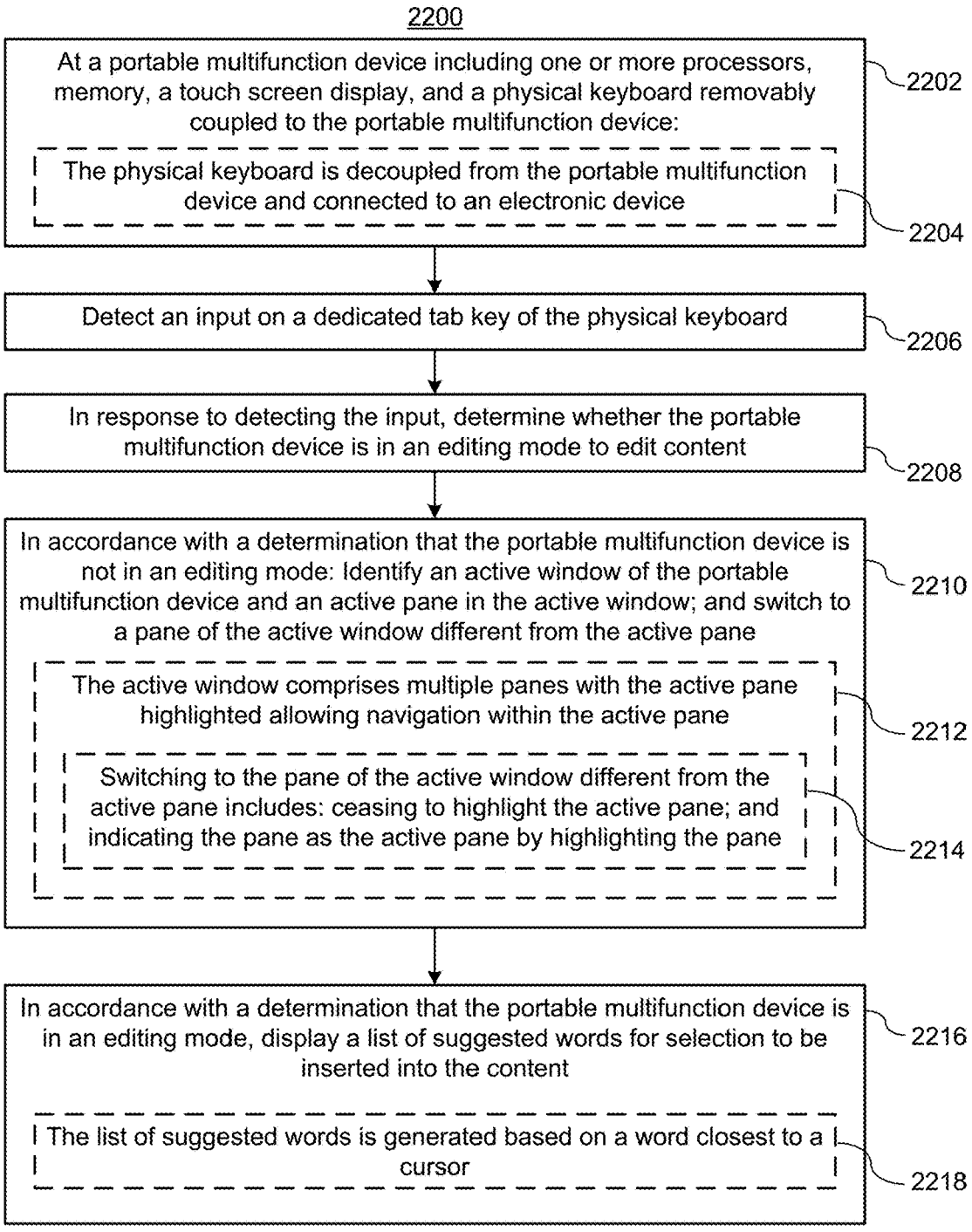

2200
At a portable multifunction device including one or more processors, memory, a touch screen display, and a physical keyboard removably coupled to the portable multifunction device:
2202
The physical keyboard is decoupled from the portable multifunction device and connected to an electronic device
2204
Detect an input on a dedicated tab key of the physical keyboard
2206
In response to detecting the input, determine whether the portable multifunction device is in an editing mode to edit content
2208
In accordance with a determination that the portable multifunction device is not in an editing mode: Identify an active window of the portable multifunction device and an active pane in the active window; and switch to a pane of the active window different from the active pane
2210
The active window comprises multiple panes with the active pane highlighted allowing navigation within the active pane
2212
Switching to the pane of the active window different from the active pane includes: ceasing to highlight the active pane; and indicating the pane as the active pane by highlighting the pane
2214
In accordance with a determination that the portable multifunction device is in an editing mode, display a list of suggested words for selection to be inserted into the content
2216
The list of suggested words is generated based on a word closest to a cursor
2218

Figure 22

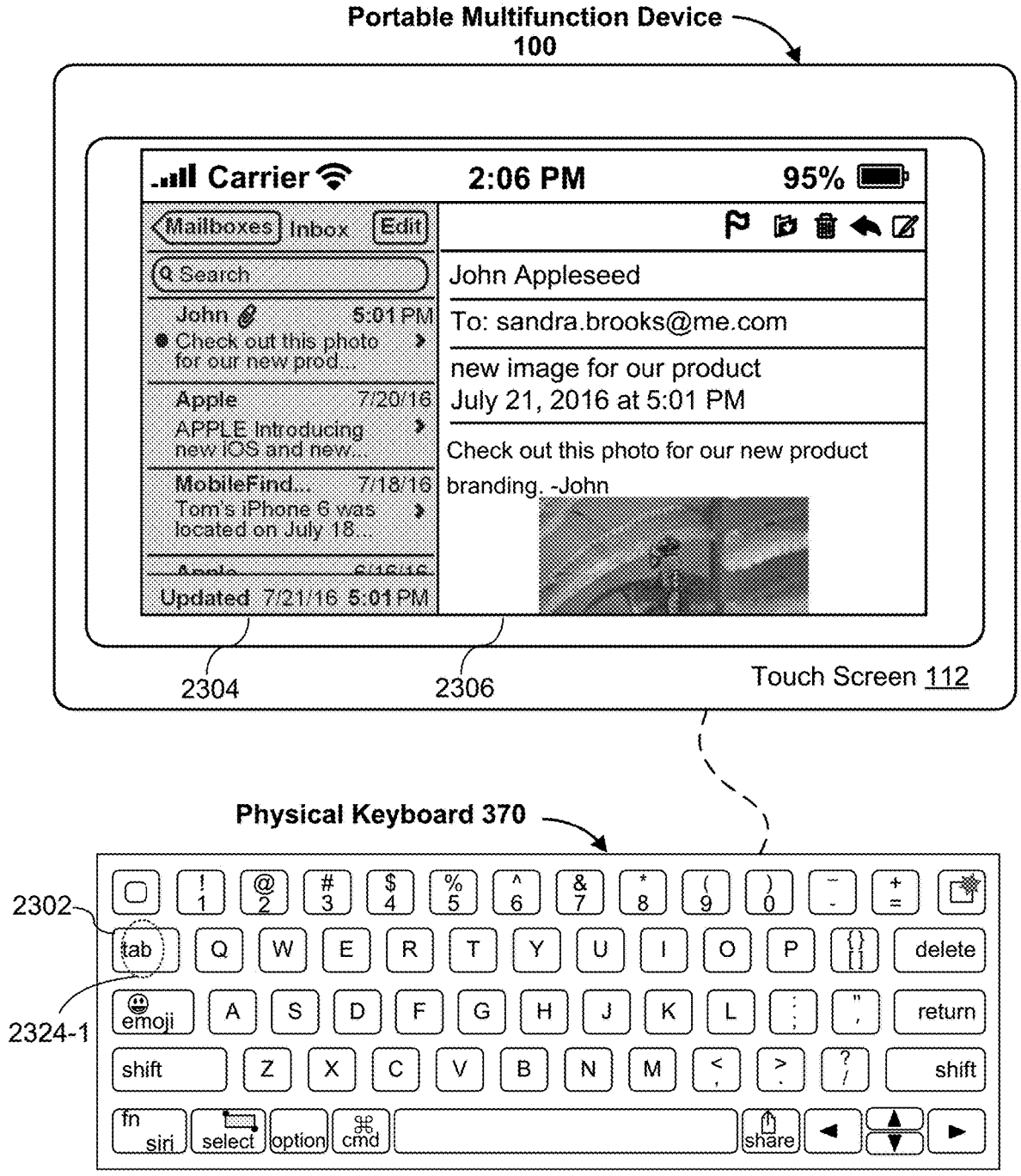

Portable Multifunction Device
100
Carrier
2:06 PM
95%
Mailboxes
Inbox
Edit
Search
John 5:01 PM
Check out this photo for our new prod...
Apple 7/20/16
APPLE Introducing new IOS and new...
MobileFind... 7/18/16
Tom's iPhone 6 was located on July 18...
Updated 7/21/16 5:01 PM
John Appleseed
To: sandra.brooks@me.com
new image for our product
July 21, 2016 at 5:01 PM
Check out this photo for our new product branding. -John
2304
2306
Touch Screen 112
Physical Keyboard 370
2302
2324-1
tab
delete
emoji
return
shift
fn
siri
select
option
cmd
share

Figure 23A

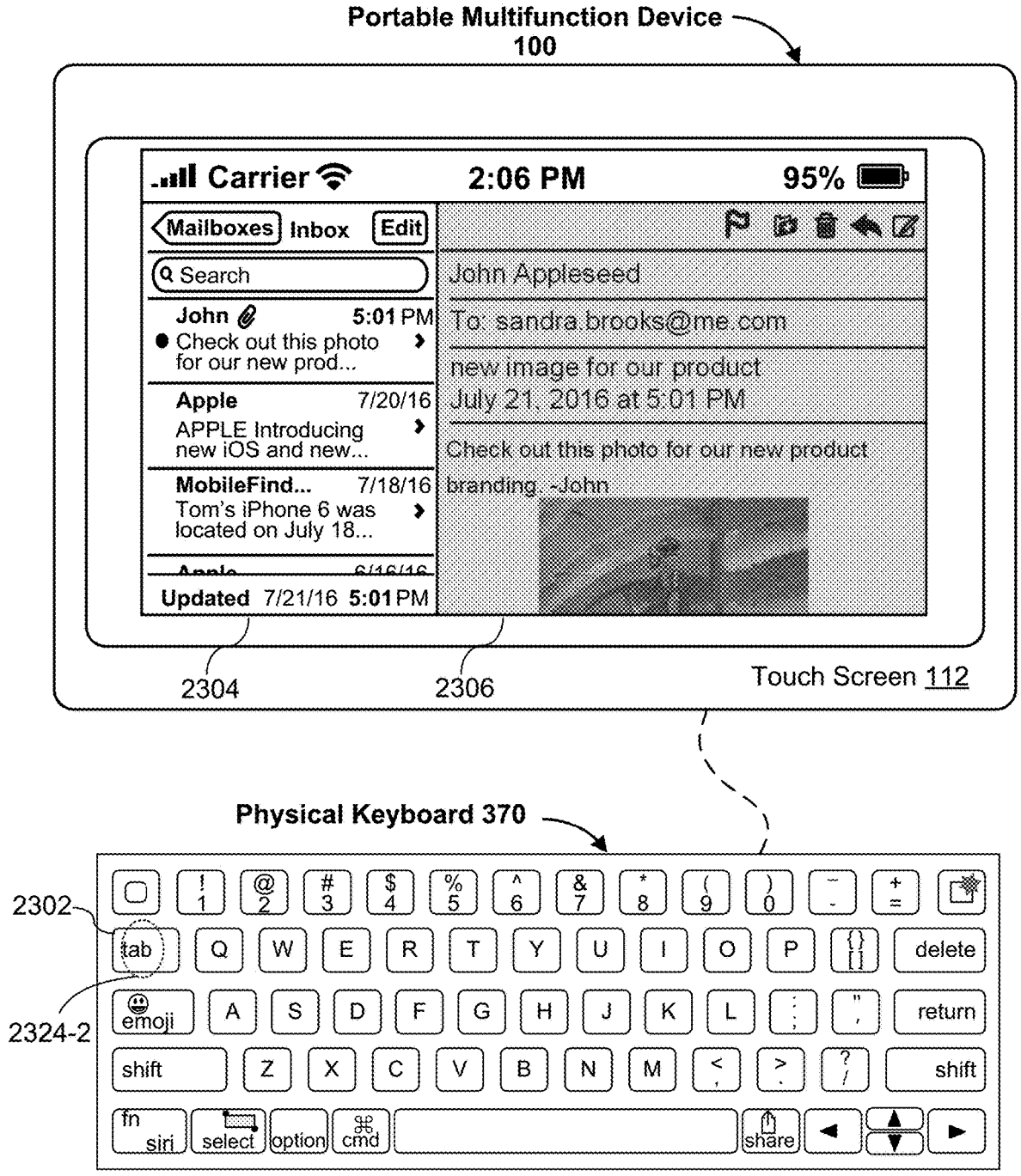

Portable Multifunction Device
100
Carrier
2:06 PM
95%
Mailboxes
Inbox
Edit
Search
John 5:01 PM
Check out this photo for our new prod...
Apple 7/20/16
APPLE Introducing new iOS and new...
MobileFind... 7/18/16
Tom's iPhone 6 was located on July 18...
Updated 7/21/16 5:01 PM
John Appleseed
To: sandra.brooks@me.com
new image for our product
July 21, 2016 at 5:01 PM
Check out this photo for our new product branding -John
2304
2306
Touch Screen 112
Physical Keyboard 370
2302
2324-2
tab
delete
emoji
return
shift
fn
siri
select
option
cmd
share

Figure 23B

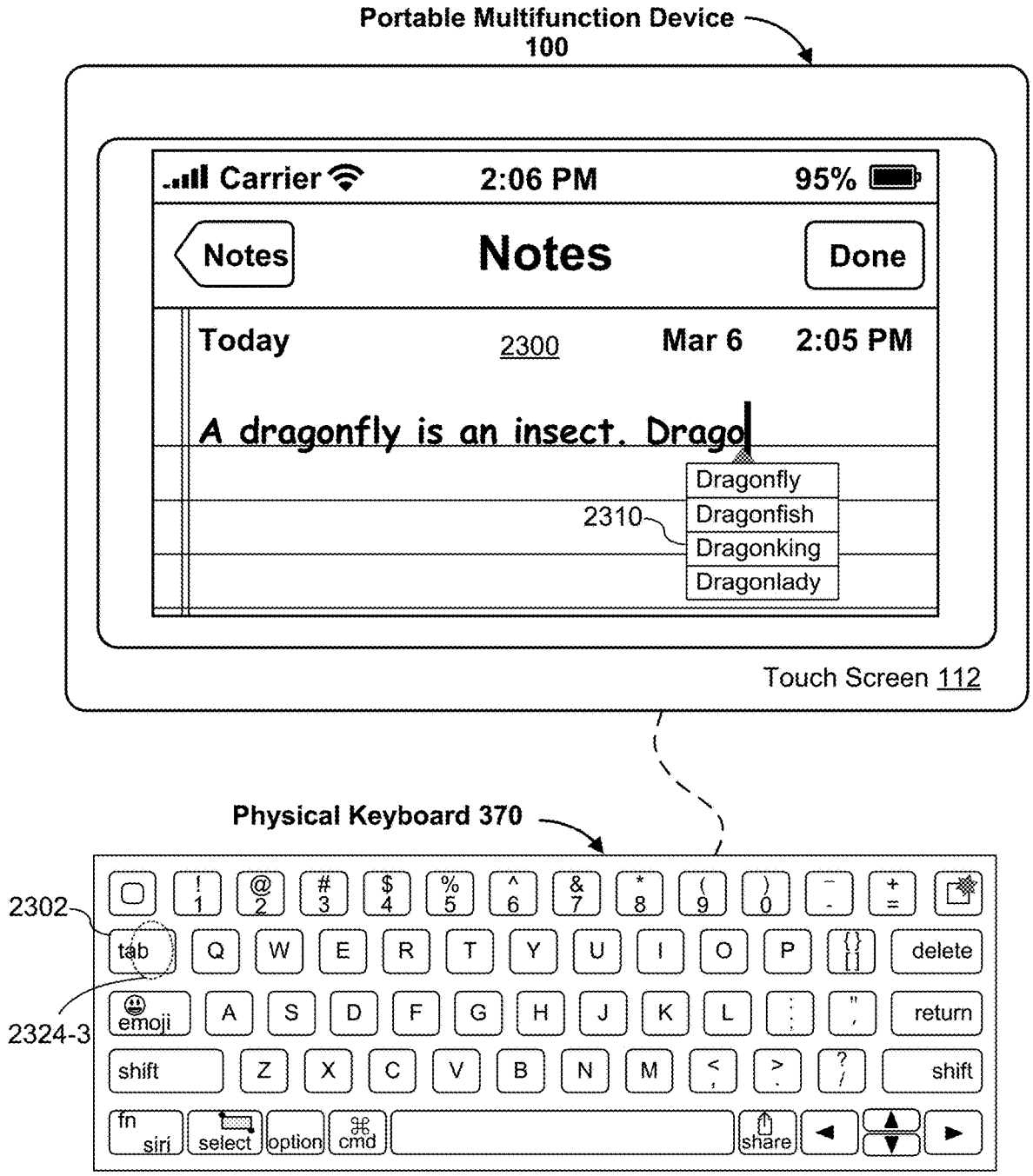

Portable Multifunction Device
100
Carrier
2:06 PM
95%
Notes
Notes
Done
Today
2300
Mar 6
2:05 PM
A dragonfly is an insect. Drago
Dragonfly
Dragonfish
Dragonking
Dragonlady
2310
Touch Screen 112
Physical Keyboard 370
2302
2324-3
tab
delete
emoji
return
shift
shift
fn
siri
select
option
cmd
share

Figure 23C

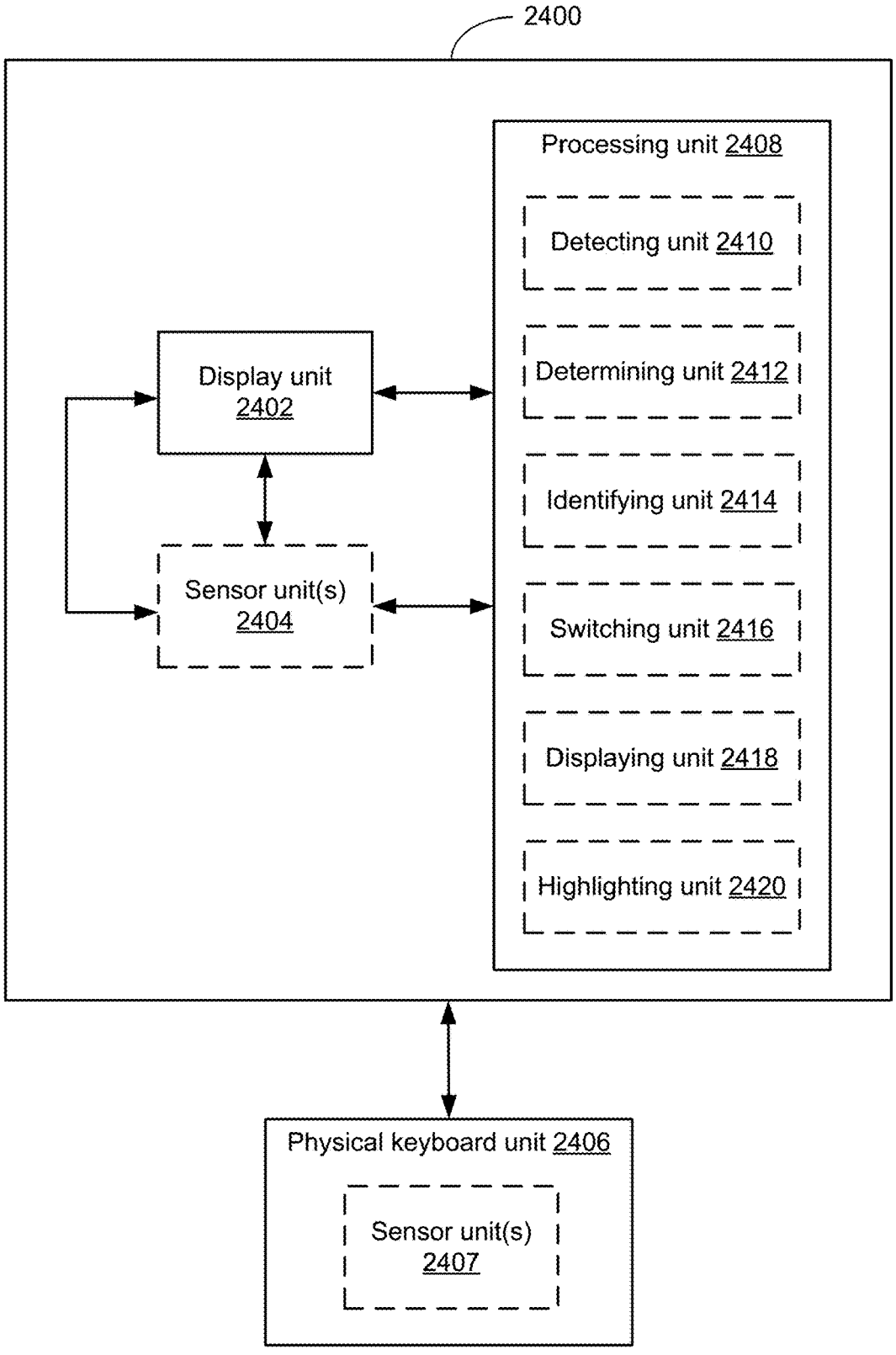

2400
Processing unit 2408
Detecting unit 2410
Determining unit 2412
Identifying unit 2414
Switching unit 2416
Displaying unit 2418
Highlighting unit 2420
Display unit 2402
Sensor unit(s) 2404
Physical keyboard unit 2406
Sensor unit(s) 2407

Figure 24

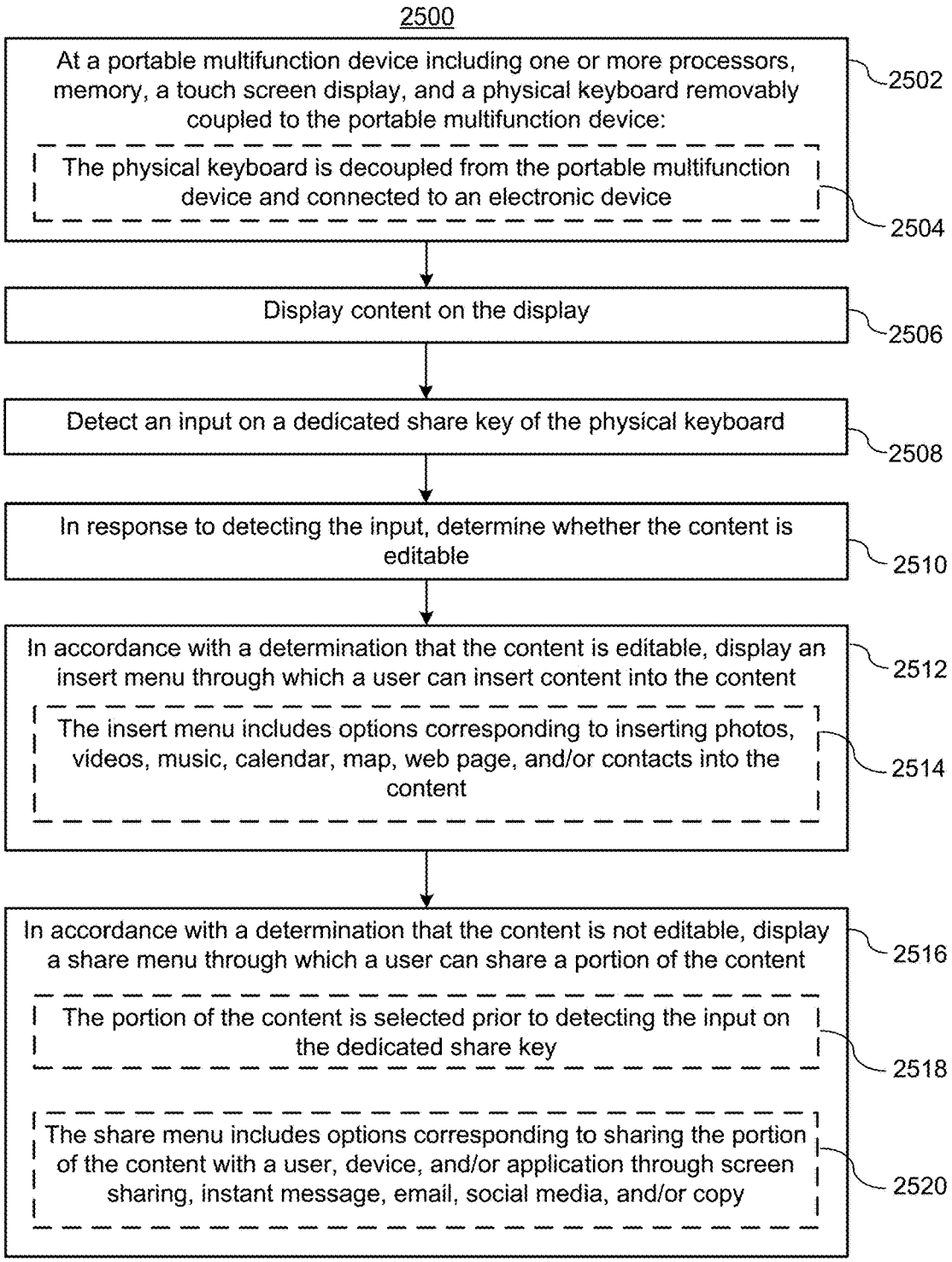

2500
At a portable multifunction device including one or more processors, memory, a touch screen display, and a physical keyboard removably coupled to the portable multifunction device:
2502
The physical keyboard is decoupled from the portable multifunction device and connected to an electronic device
2504
Display content on the display
2506
Detect an input on a dedicated share key of the physical keyboard
2508
In response to detecting the input, determine whether the content is editable
2510
In accordance with a determination that the content is editable, display an insert menu through which a user can insert content into the content
2512
The insert menu includes options corresponding to inserting photos, videos, music, calendar, map, web page, and/or contacts into the content
2514
In accordance with a determination that the content is not editable, display a share menu through which a user can share a portion of the content
2516
The portion of the content is selected prior to detecting the input on the dedicated share key
2518
The share menu includes options corresponding to sharing the portion of the content with a user, device, and/or application through screen sharing, instant message, email, social media, and/or copy
2520

Figure 25

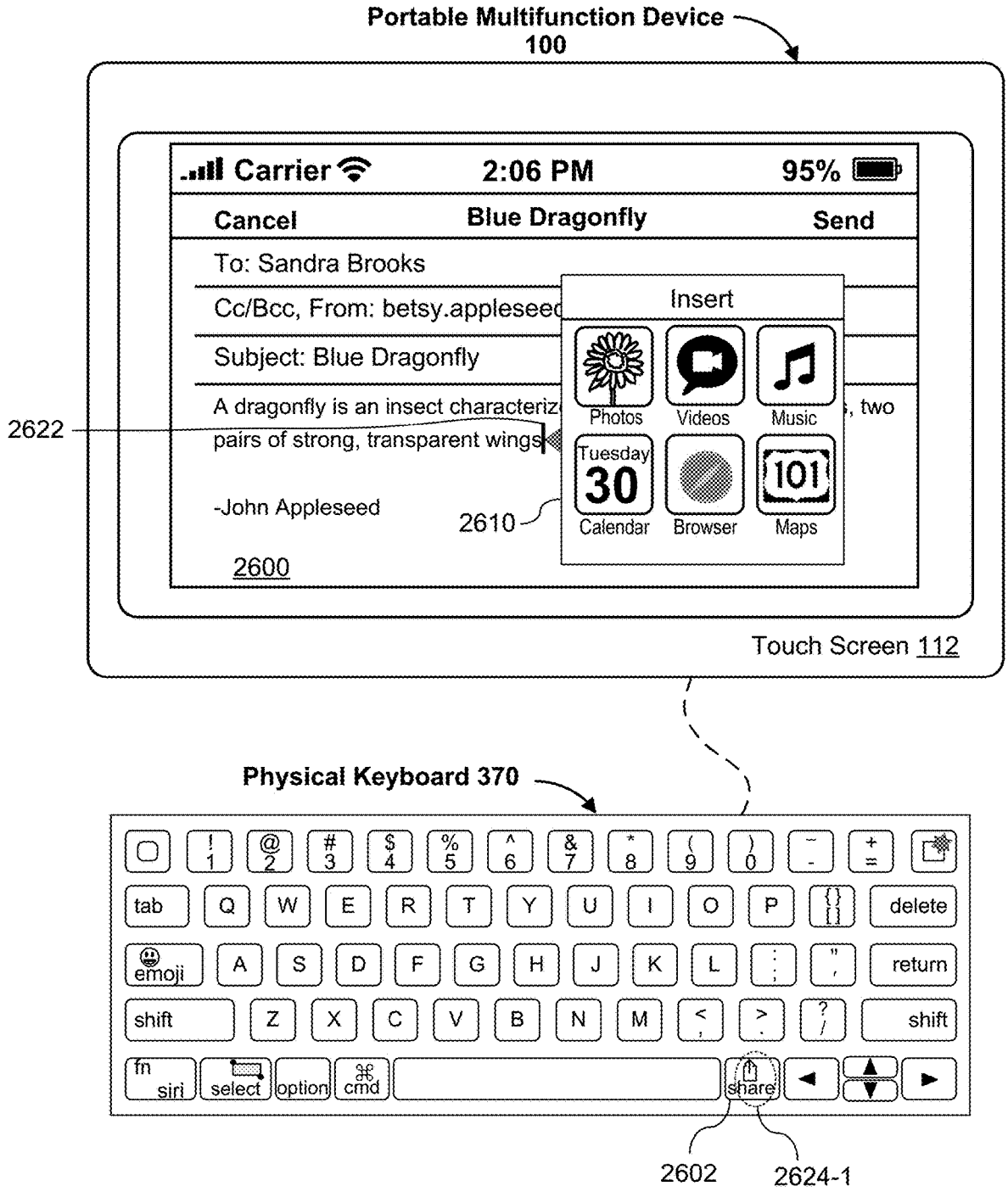

Portable Multifunction Device
100
Carrier
2:06 PM
95%
Cancel
Blue Dragonfly
Send
To: Sandra Brooks
Cc/Bcc, From: betsy.appleseed
Subject: Blue Dragonfly
A dragonfly is an insect characteriz
, two
pairs of strong, transparent wings
-John Appleseed
2600
2622
2610
Insert
Photos
Videos
Music
Tuesday
30
Calendar
Browser
101
Maps
Touch Screen 112
Physical Keyboard 370
tab
delete
emoji
return
shift
shift
fn
siri
select
option
cmd
share
2602
2624-1

Figure 26A

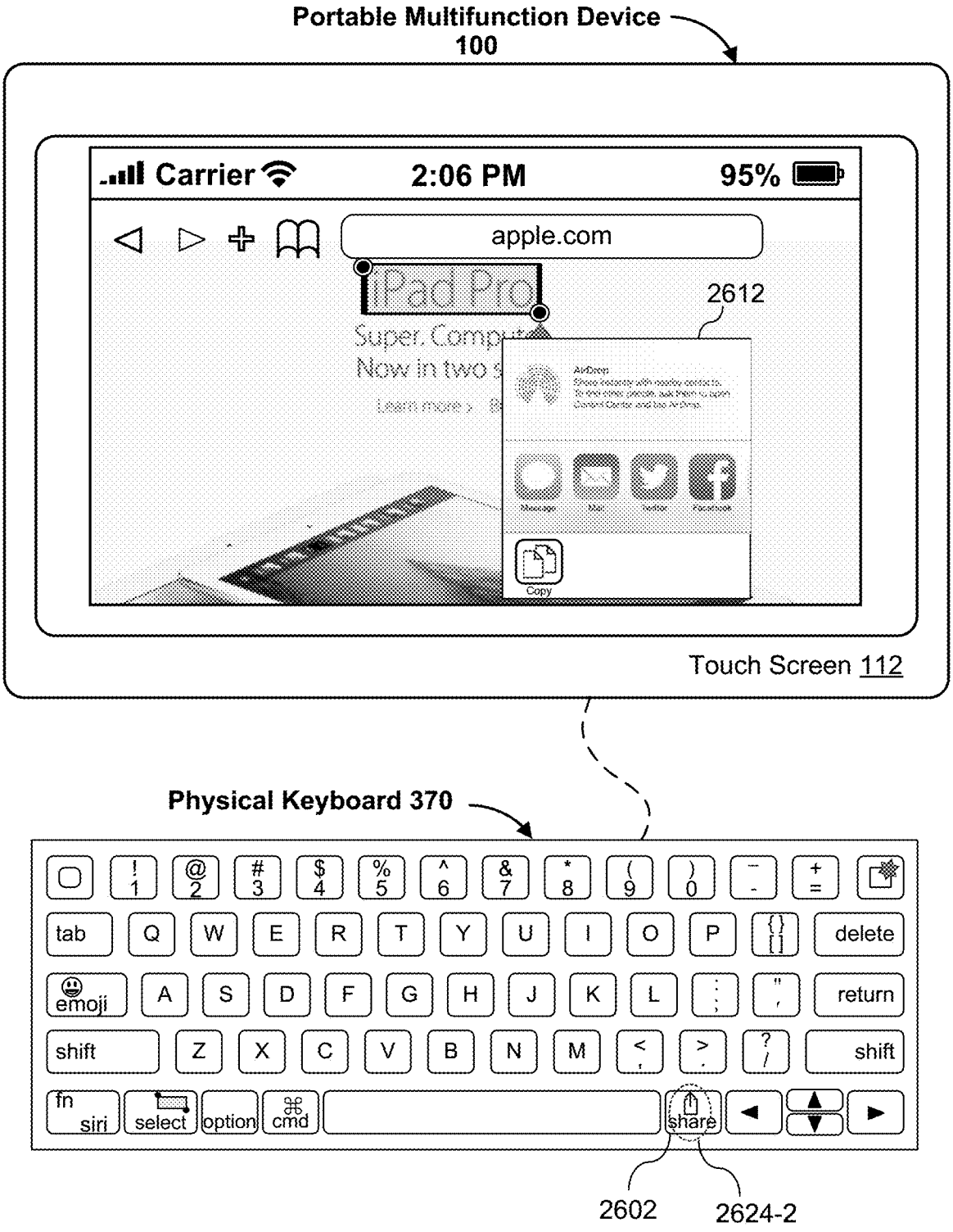

Portable Multifunction Device
100
Carrier
2:06 PM
95%
apple.com
iPad Pro
2612
Touch Screen 112
Physical Keyboard 370
tab
delete
emoji
return
shift
shift
fn
siri
select
option
cmd
share
2602
2624-2

Figure 26B

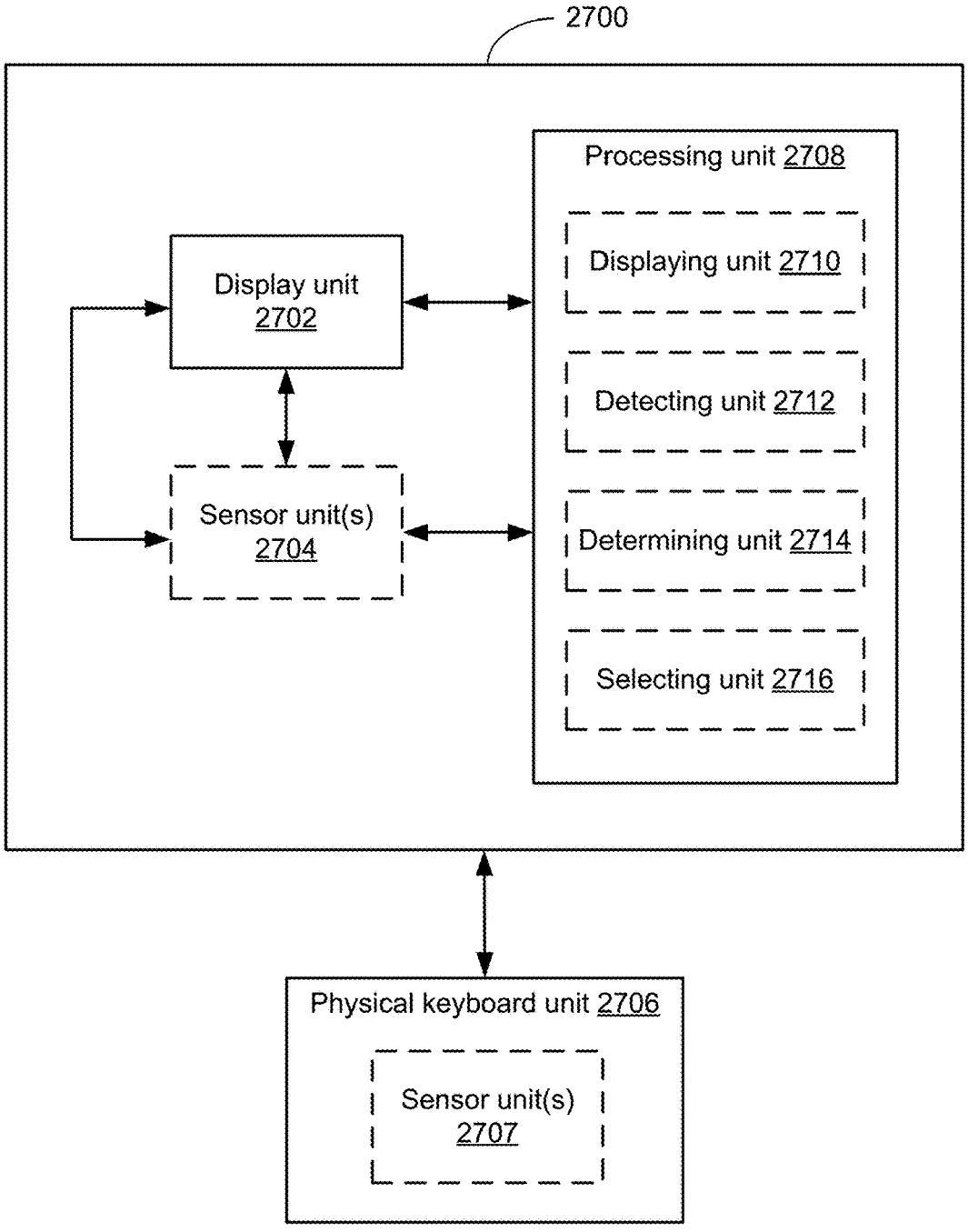

2700
Processing unit 2708
Displaying unit 2710
Detecting unit 2712
Determining unit 2714
Selecting unit 2716
Display unit 2702
Sensor unit(s) 2704
Physical keyboard unit 2706
Sensor unit(s) 2707

Figure 27

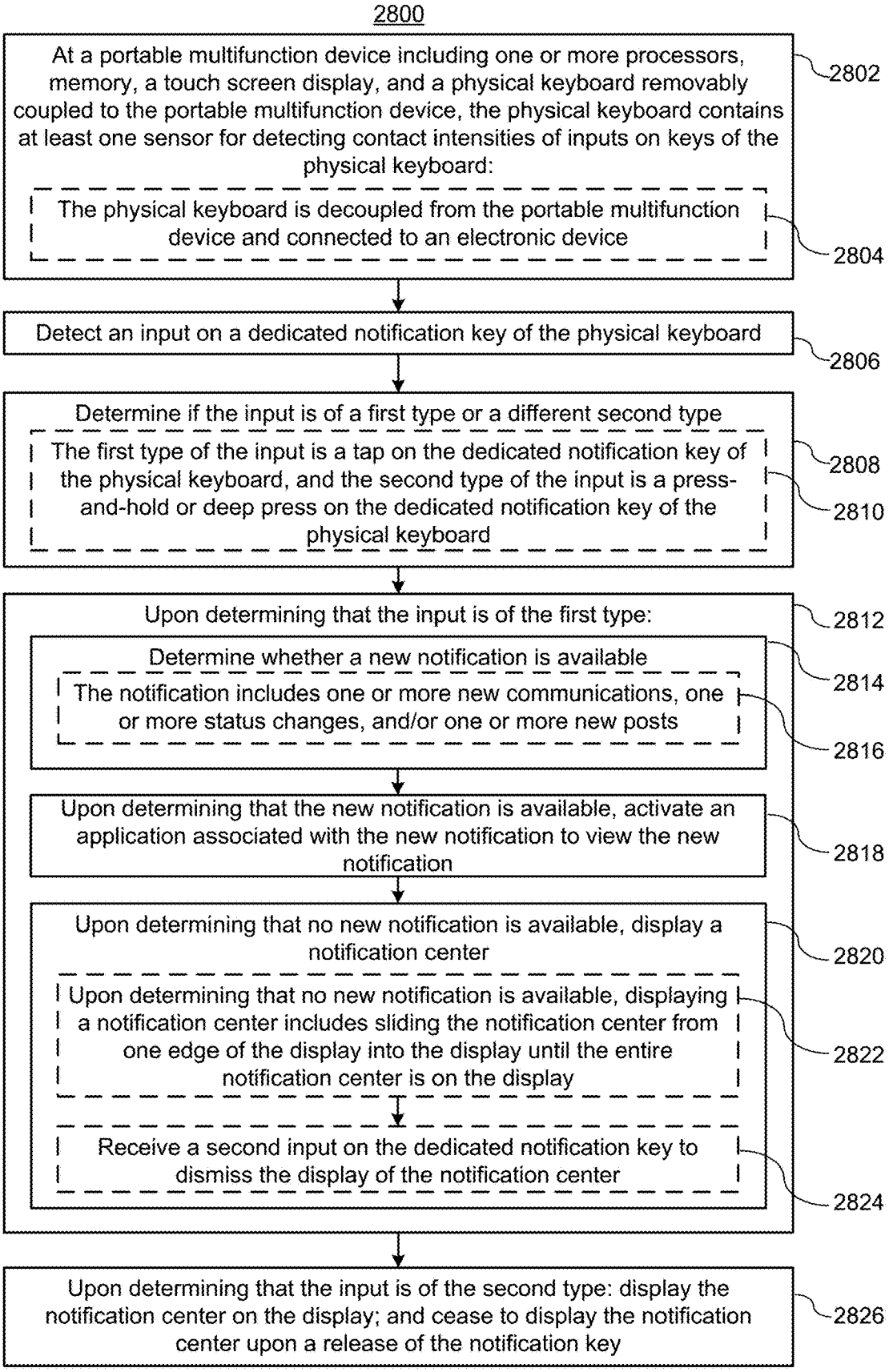

2800
At a portable multifunction device including one or more processors, memory, a touch screen display, and a physical keyboard removably coupled to the portable multifunction device, the physical keyboard contains at least one sensor for detecting contact intensities of inputs on keys of the physical keyboard:
The physical keyboard is decoupled from the portable multifunction device and connected to an electronic device
2802
2804
Detect an input on a dedicated notification key of the physical keyboard
2806
Determine if the input is of a first type or a different second type
The first type of the input is a tap on the dedicated notification key of the physical keyboard, and the second type of the input is a press-and-hold or deep press on the dedicated notification key of the physical keyboard
2808
2810
Upon determining that the input is of the first type:
2812
Determine whether a new notification is available
The notification includes one or more new communications, one or more status changes, and/or one or more new posts
2814
2816
Upon determining that the new notification is available, activate an application associated with the new notification to view the new notification
2818
Upon determining that no new notification is available, display a notification center
Upon determining that no new notification is available, displaying a notification center includes sliding the notification center from one edge of the display into the display until the entire notification center is on the display
2820
2822
Receive a second input on the dedicated notification key to dismiss the display of the notification center
2824
Upon determining that the input is of the second type: display the notification center on the display; and cease to display the notification center upon a release of the notification key
2826

Figure 28

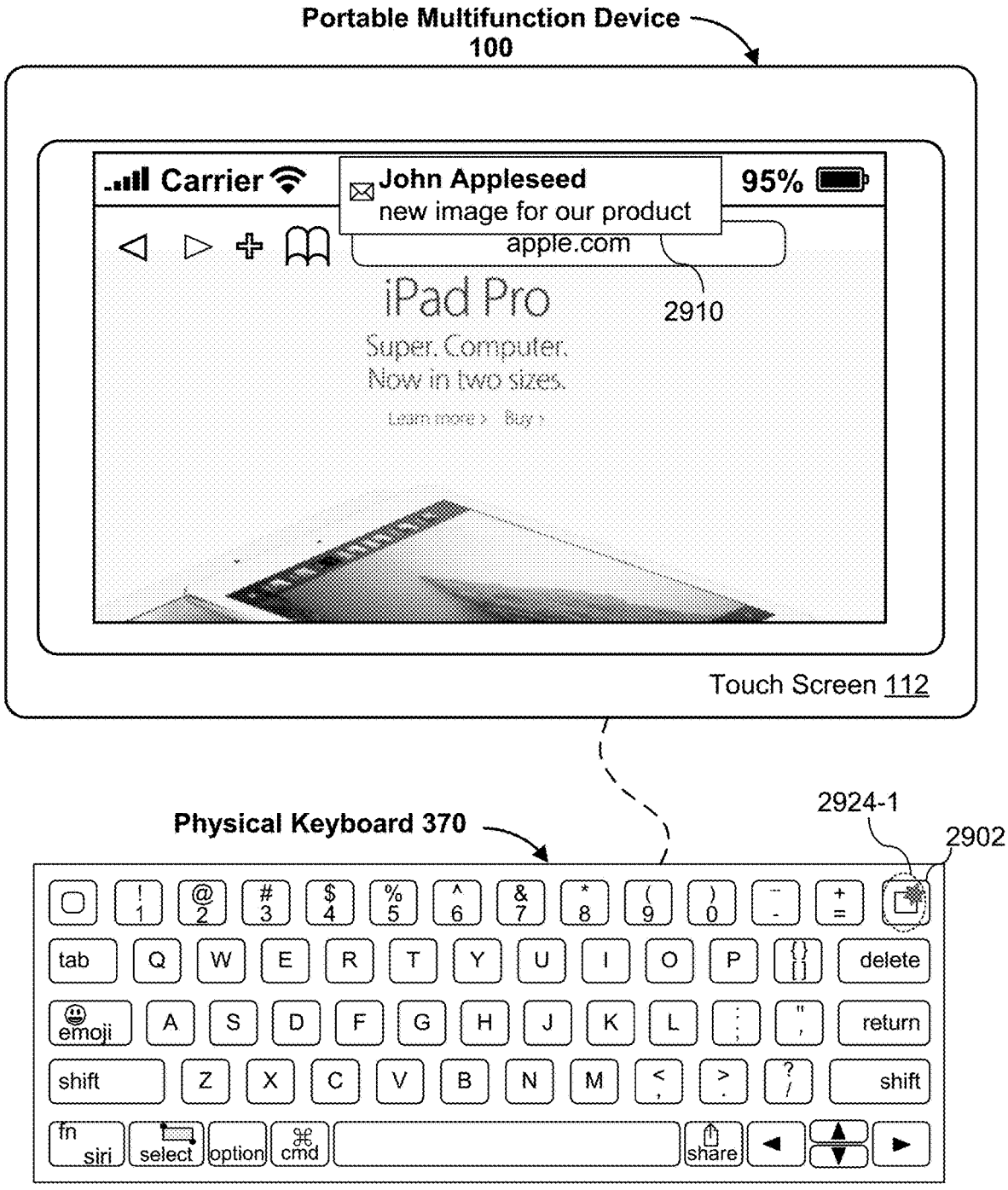

Portable Multifunction Device
100
Carrier
John Appleseed
new image for our product
95%
apple.com
2910
iPad Pro
Super. Computer.
Now in two sizes.
Touch Screen 112
Physical Keyboard 370
2924-1
2902
tab
delete
emoji
return
shift
shift
fn
siri
select
option
cmd
share

Figure 29A

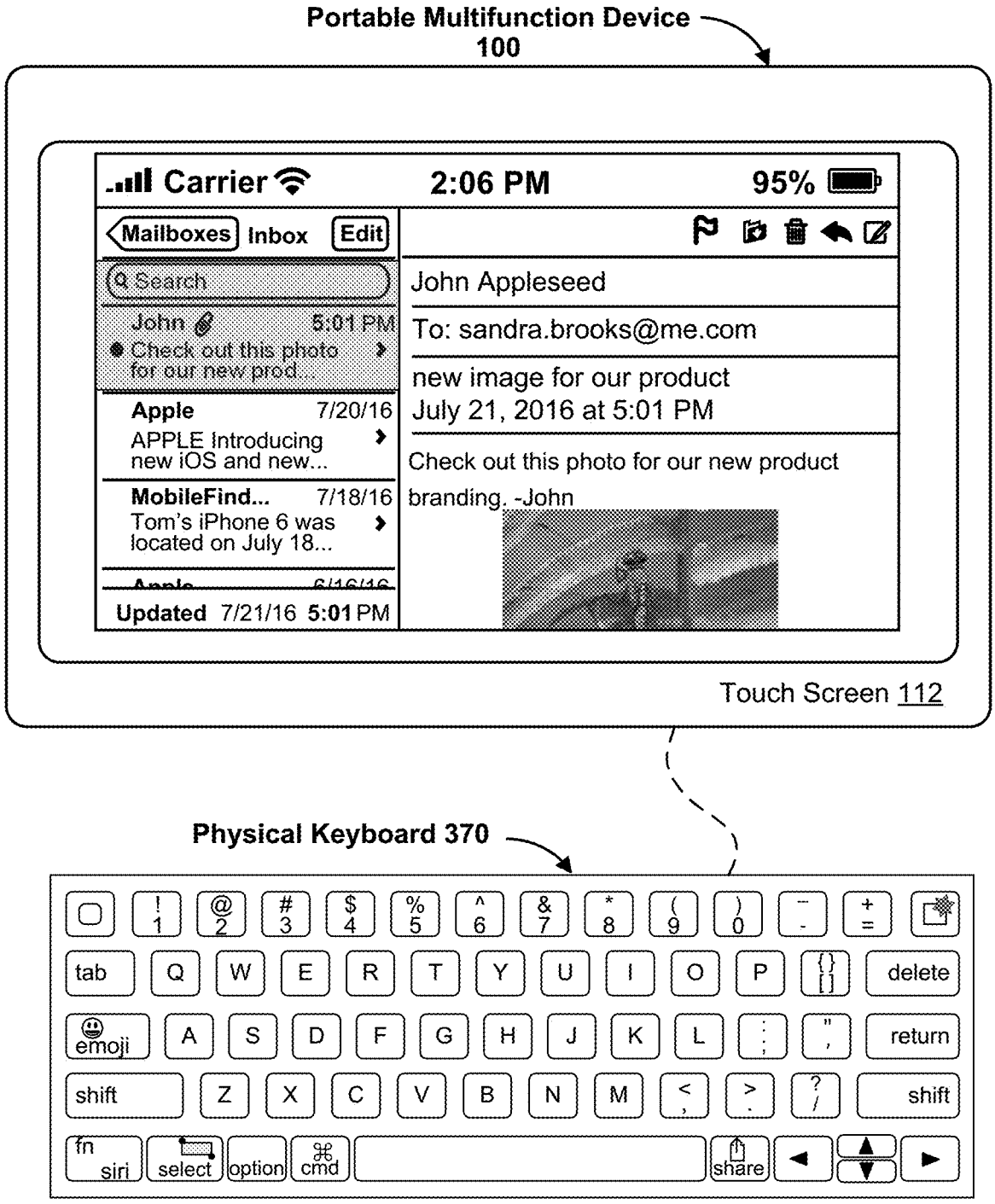

Portable Multifunction Device
100
Carrier
2:06 PM
95%
Mailboxes
Inbox
Edit
Search
John
5:01 PM
Check out this photo for our new prod...
Apple
7/20/16
APPLE Introducing new iOS and new...
MobileFind...
7/18/16
Tom's iPhone 6 was located on July 18...
Updated 7/21/16 5:01 PM
John Appleseed
To: sandra.brooks@me.com
new image for our product
July 21, 2016 at 5:01 PM
Check out this photo for our new product branding. -John
Touch Screen 112
Physical Keyboard 370
tab
delete
emoji
return
shift
fn
siri
select
option
cmd
share

Figure 29B

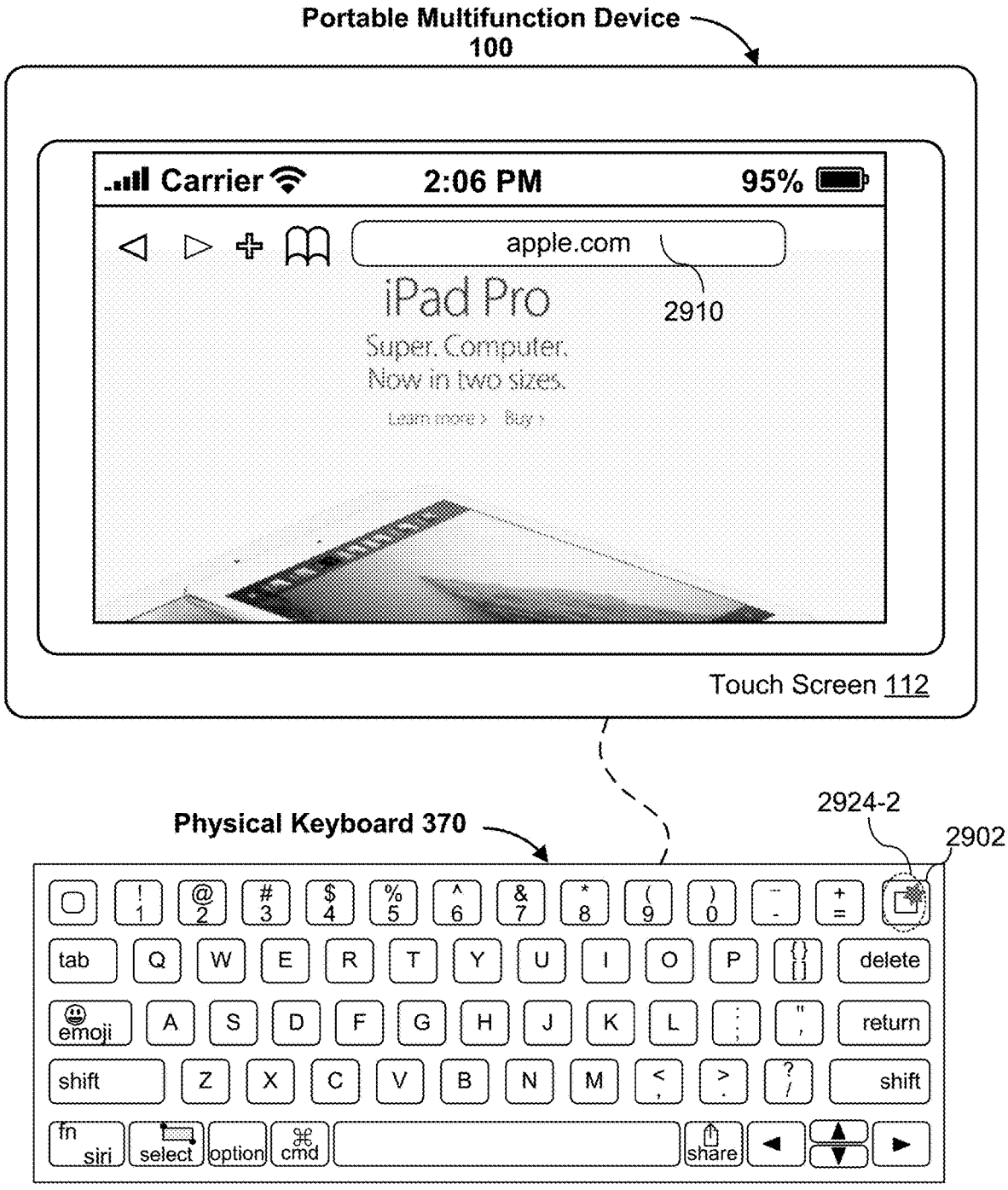

Portable Multifunction Device
100
Carrier
2:06 PM
95%
apple.com
2910
iPad Pro
Super. Computer.
Now in two sizes.
Touch Screen 112
Physical Keyboard 370
2924-2
2902
tab
delete
emoji
return
shift
shift
fn
siri
select
option
cmd
share

Figure 29C

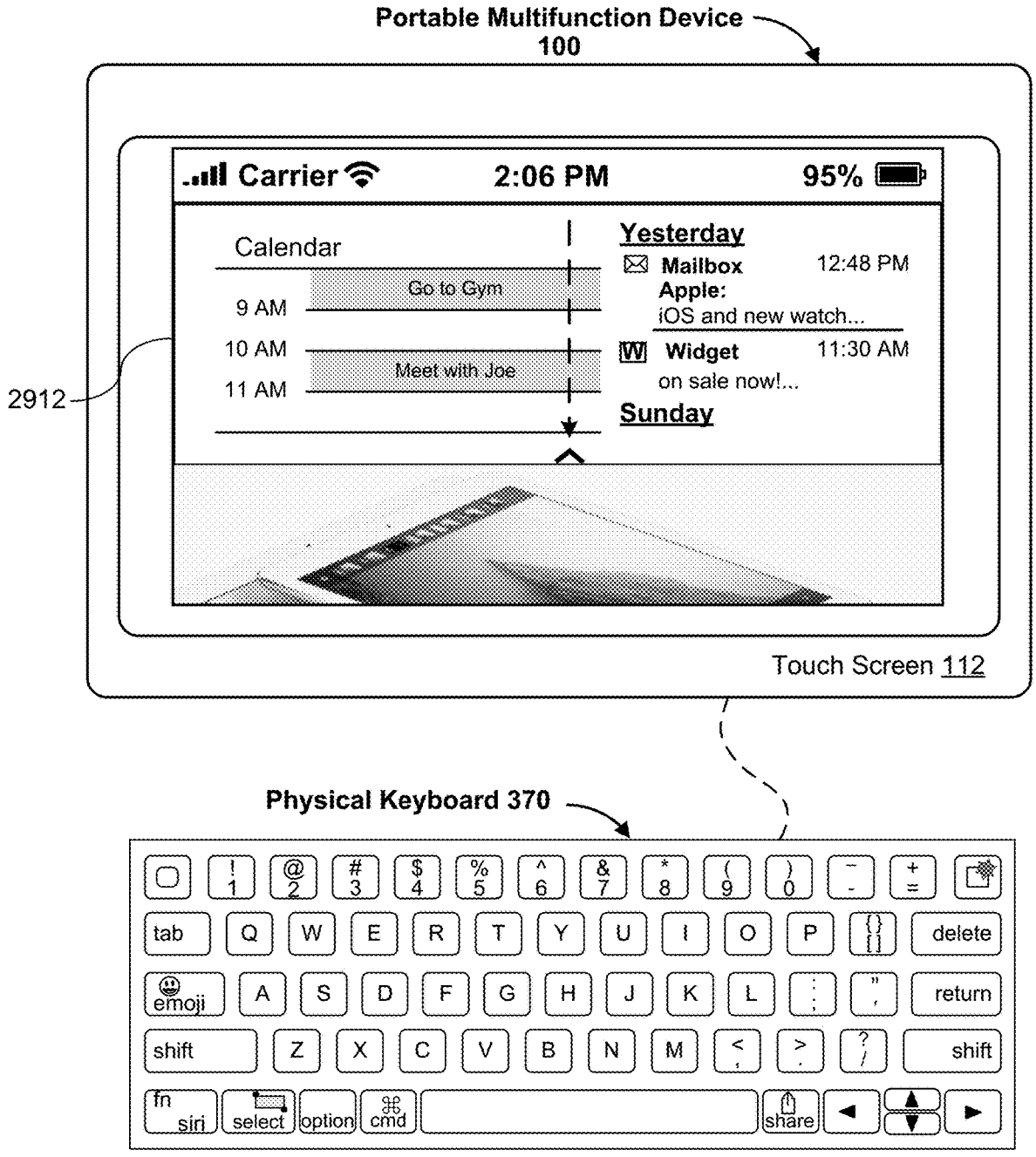

Portable Multifunction Device
100
Carrier
2:06 PM
95%
Calendar
9 AM
10 AM
11 AM
Go to Gym
Meet with Joe
Yesterday
Mailbox
12:48 PM
Apple:
iOS and new watch...
Widget
11:30 AM
on sale now!...
Sunday
2912
Touch Screen 112
Physical Keyboard 370
tab
delete
emoji
return
shift
shift
fn
siri
select
option
cmd
share

Figure 29D

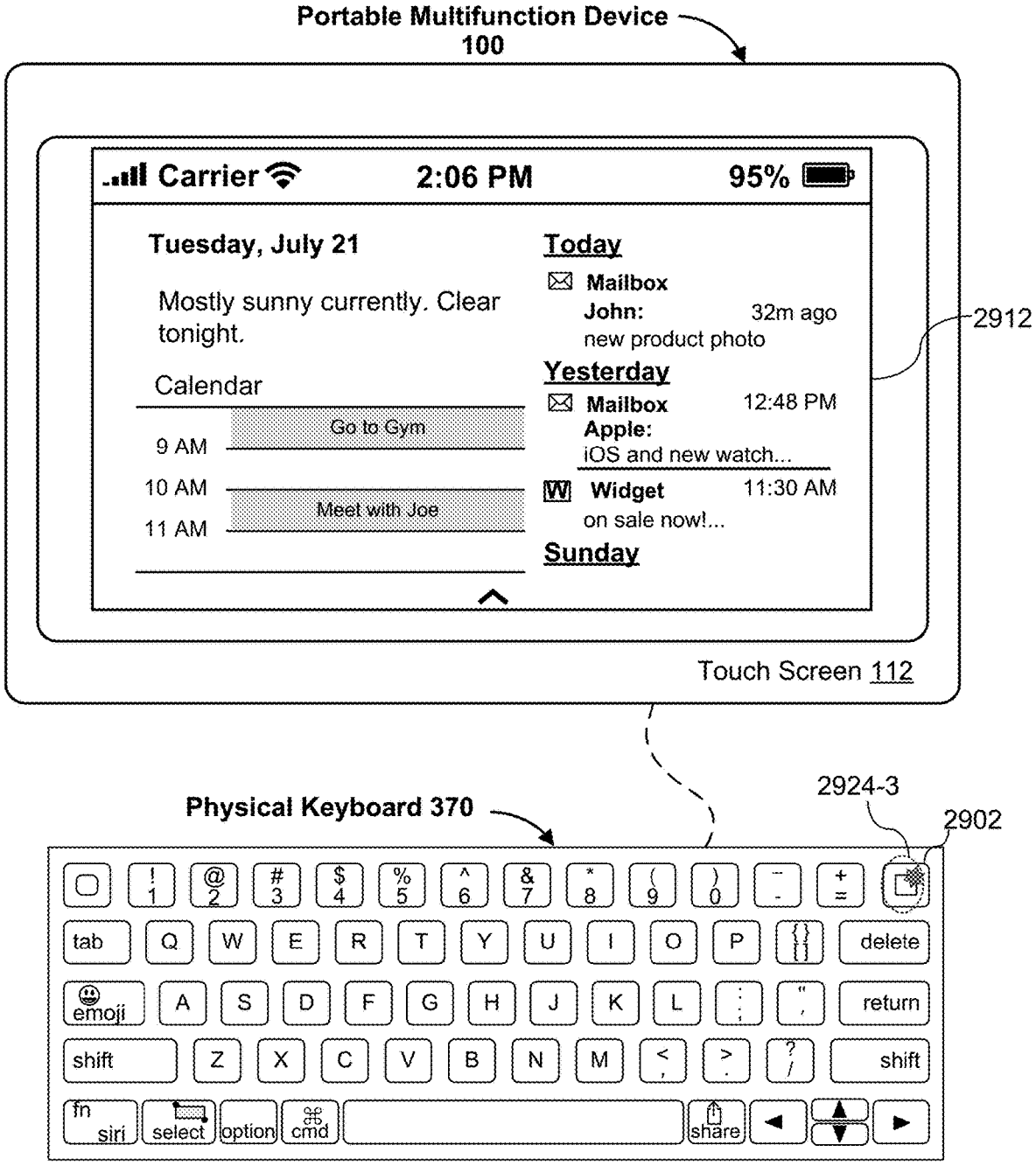

Portable Multifunction Device
100
Carrier
2:06 PM
95%
Tuesday, July 21
Mostly sunny currently. Clear tonight.
Calendar
9 AM
Go to Gym
10 AM
11 AM
Meet with Joe
Today
Mailbox
John:
32m ago
new product photo
Yesterday
Mailbox
12:48 PM
Apple:
iOS and new watch...
Widget
11:30 AM
on sale now!...
Sunday
2912
Touch Screen 112
Physical Keyboard 370
2924-3
2902
tab
delete
emoji
return
shift
shift
fn
siri
select
option
cmd
share

Figure 29E

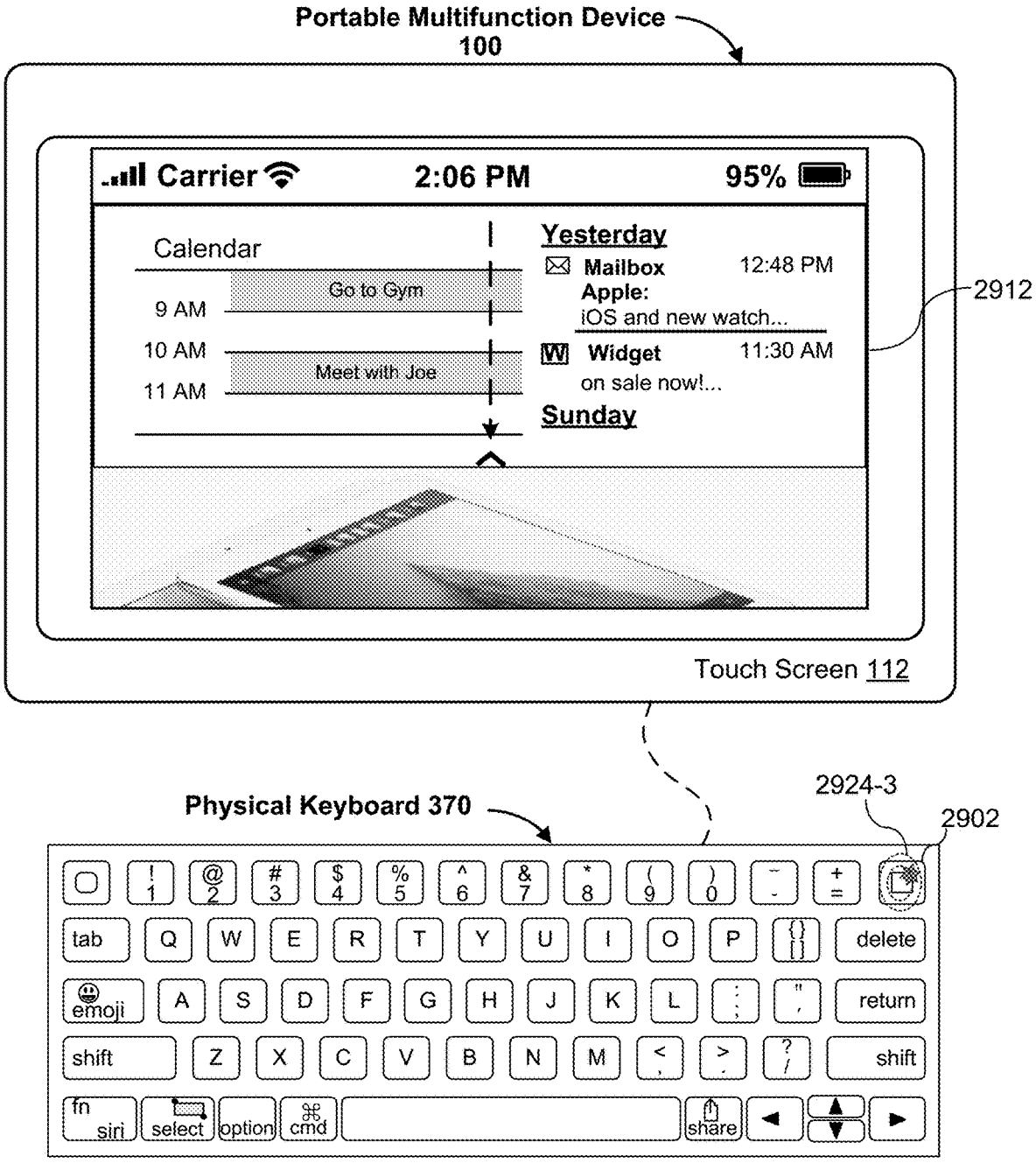

Portable Multifunction Device
100
Carrier
2:06 PM
95%
Calendar
9 AM
Go to Gym
10 AM
Meet with Joe
11 AM
Yesterday
Mailbox
12:48 PM
Apple:
iOS and new watch...
Widget
11:30 AM
on sale now!...
Sunday
2912
Touch Screen 112
Physical Keyboard 370
2924-3
2902
tab
delete
emoji
return
shift
shift
fn
siri
select
option
cmd
share

Figure 29F

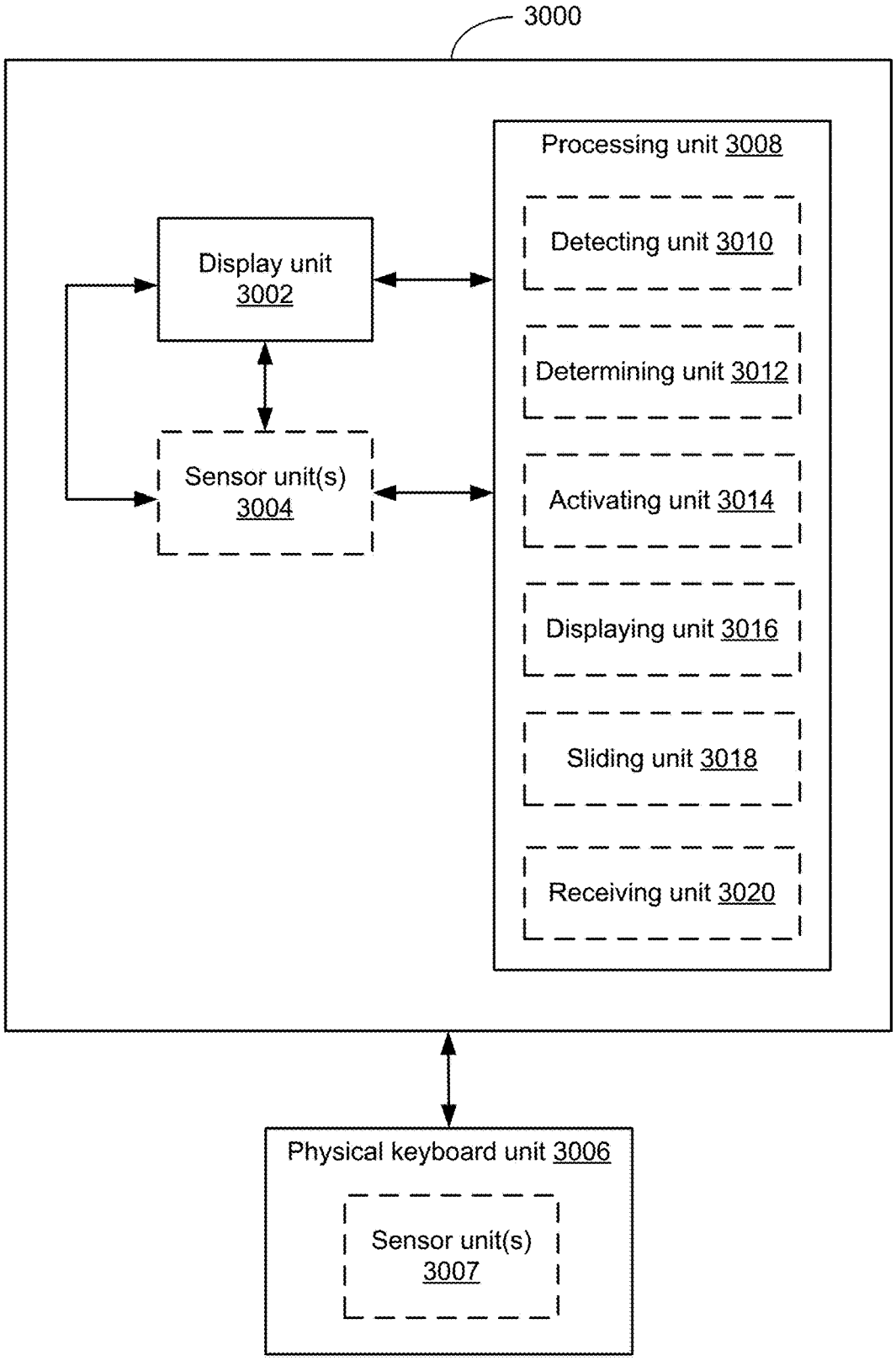

3000
Processing unit 3008
Detecting unit 3010
Determining unit 3012
Activating unit 3014
Displaying unit 3016
Sliding unit 3018
Receiving unit 3020
Display unit 3002
Sensor unit(s) 3004
Physical keyboard unit 3006
Sensor unit(s) 3007

Figure 30

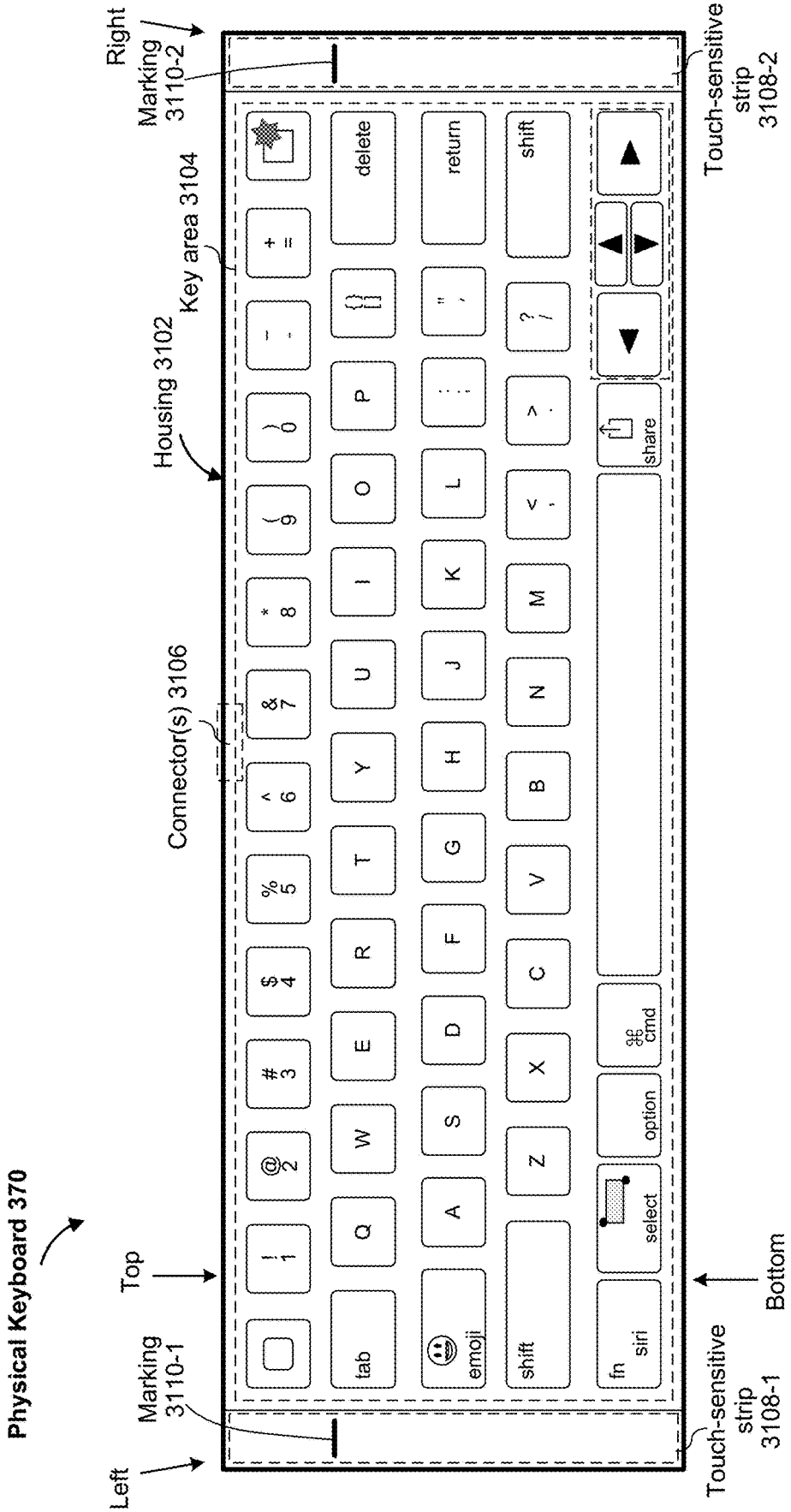

Physical Keyboard 370
Top
Left
Right
Bottom
Marking 3110-1
Marking 3110-2
Touch-sensitive strip 3108-1
Touch-sensitive strip 3108-2
Housing 3102
Key area 3104
Connector(s) 3106
tab
emoji
shift
fn
siri
select
option
cmd
share
delete
return
shift

Figure 31A

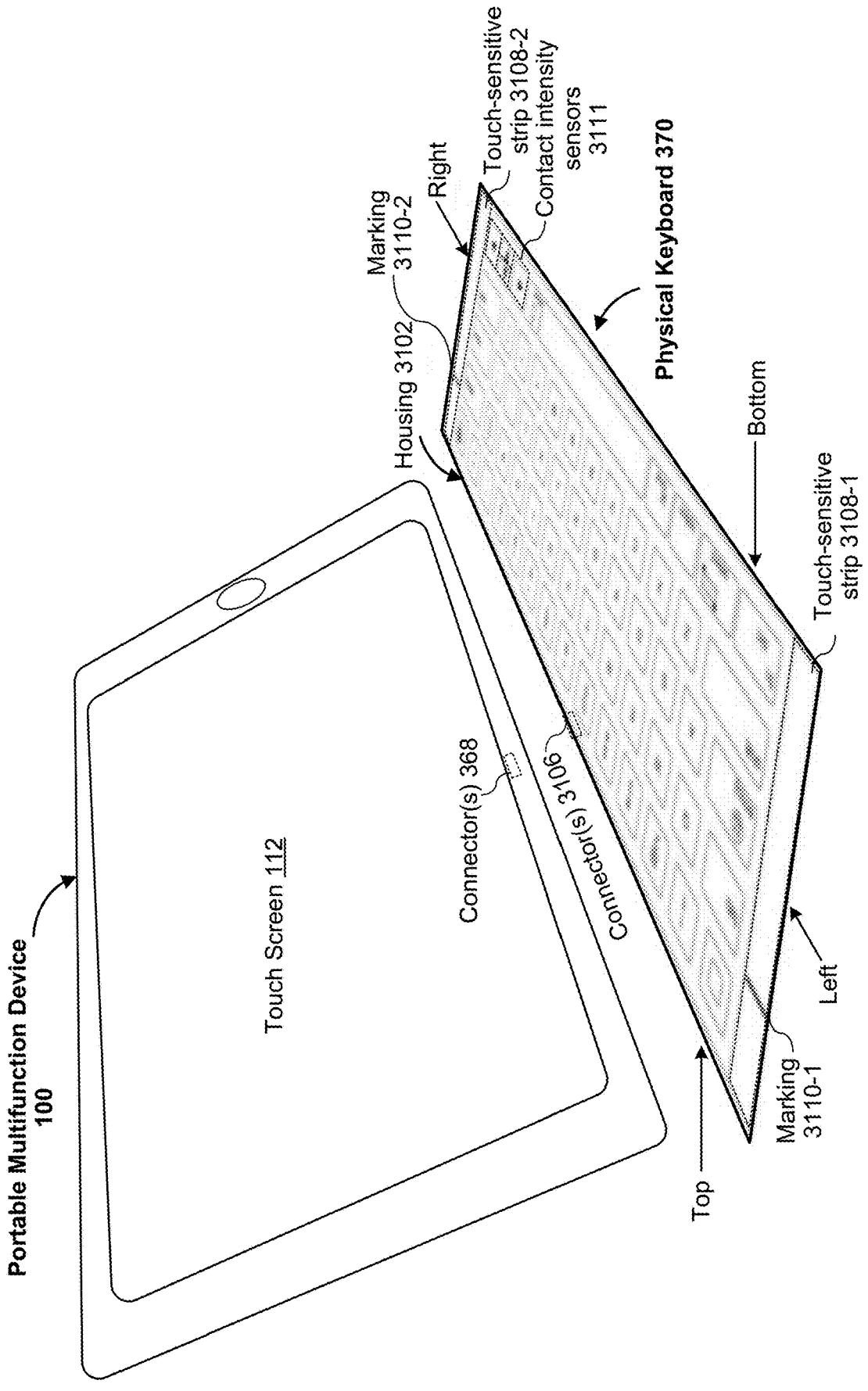

Portable Multifunction Device 100
Touch Screen 112
Connector(s) 368
Connector(s) 3106
Housing 3102
Marking 3110-2
Right
Touch-sensitive strip 3108-2
Contact intensity sensors 3111
Physical Keyboard 370
Bottom
Touch-sensitive strip 3108-1
Left
Marking 3110-1
Top

Figure 31B

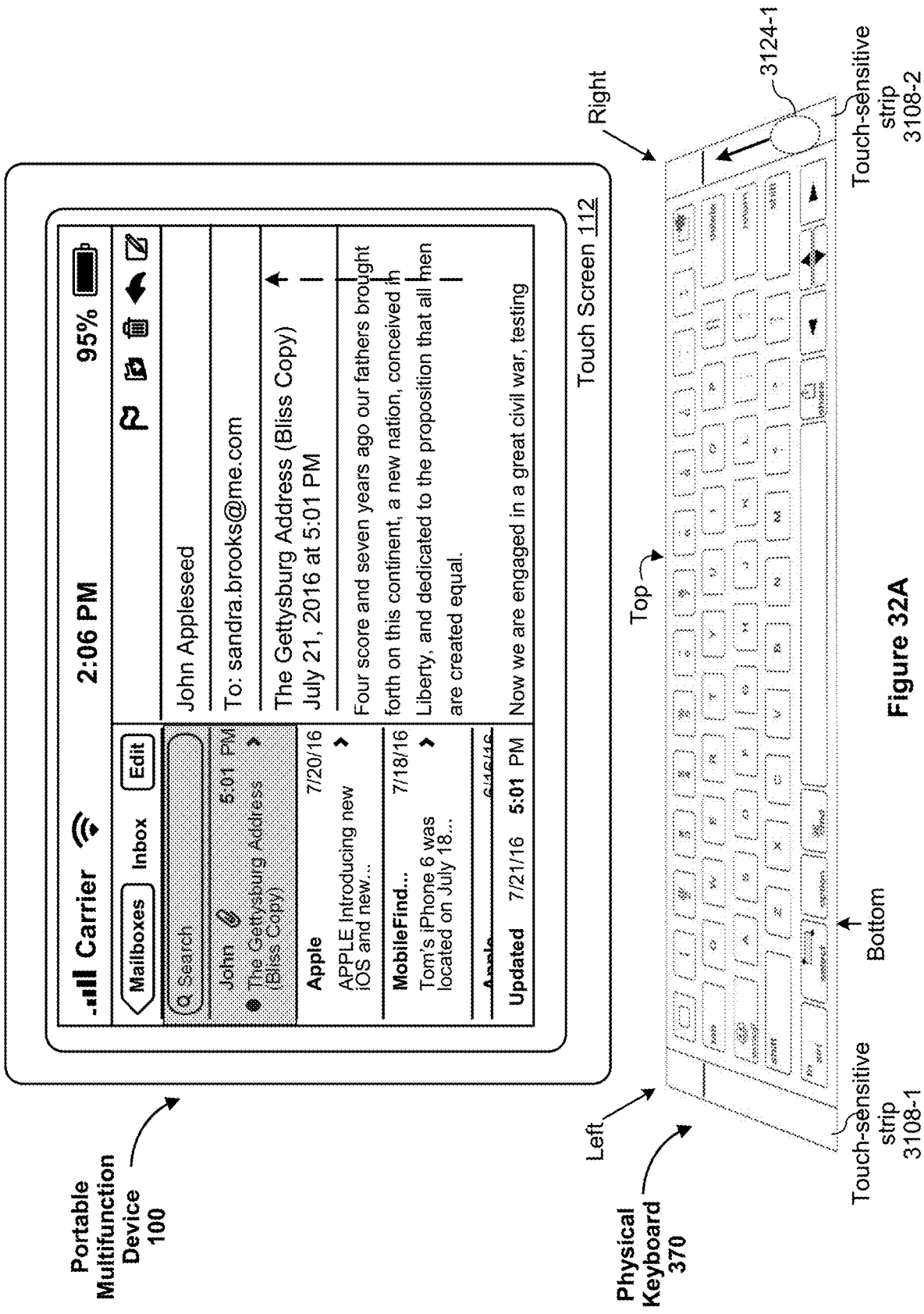

Portable Multifunction Device 100
Carrier
2:06 PM
95%
Mailboxes
Inbox
Edit
Search
John
5:01 PM
The Gettysburg Address (Bliss Copy)
Apple
7/20/16
APPLE Introducing new iOS and new...
MobileFind...
7/18/16
Tom's iPhone 6 was located on July 18...
Updated 7/21/16 5:01 PM
John Appleseed
To: sandra.brooks@me.com
The Gettysburg Address (Bliss Copy)
July 21, 2016 at 5:01 PM
Four score and seven years ago our fathers brought forth on this continent, a new nation, conceived in Liberty, and dedicated to the proposition that all men are created equal.
Now we are engaged in a great civil war, testing
Touch Screen 112
Physical Keyboard 370
Left
Right
Top
Bottom
3124-1
Touch-sensitive strip 3108-1
Touch-sensitive strip 3108-2

Figure 32A

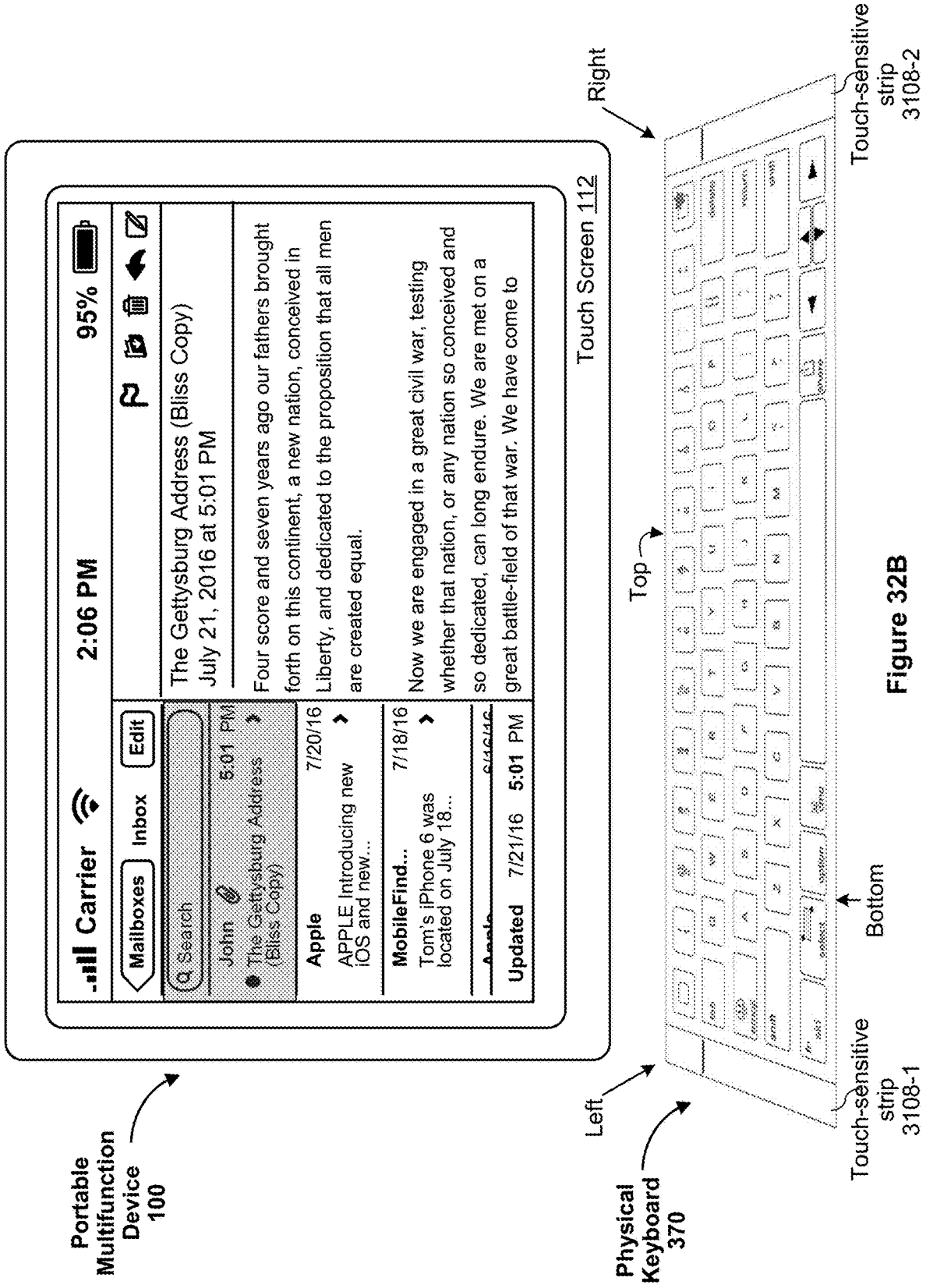

Portable Multifunction Device 100
Carrier
2:06 PM
95%
Mailboxes
Inbox
Edit
Search
John
5:01 PM
The Gettysburg Address (Bliss Copy)
Apple
7/20/16
APPLE Introducing new iOS and new...
MobileFind...
7/18/16
Tom's iPhone 6 was located on July 18...
Updated
7/21/16
5:01 PM
The Gettysburg Address (Bliss Copy)
July 21, 2016 at 5:01 PM
Four score and seven years ago our fathers brought forth on this continent, a new nation, conceived in Liberty, and dedicated to the proposition that all men are created equal.
Now we are engaged in a great civil war, testing whether that nation, or any nation so conceived and so dedicated, can long endure. We are met on a great battle-field of that war. We have come to
Touch Screen 112
Physical Keyboard 370
Left
Right
Top
Bottom
Touch-sensitive strip 3108-1
Touch-sensitive strip 3108-2

Figure 32B

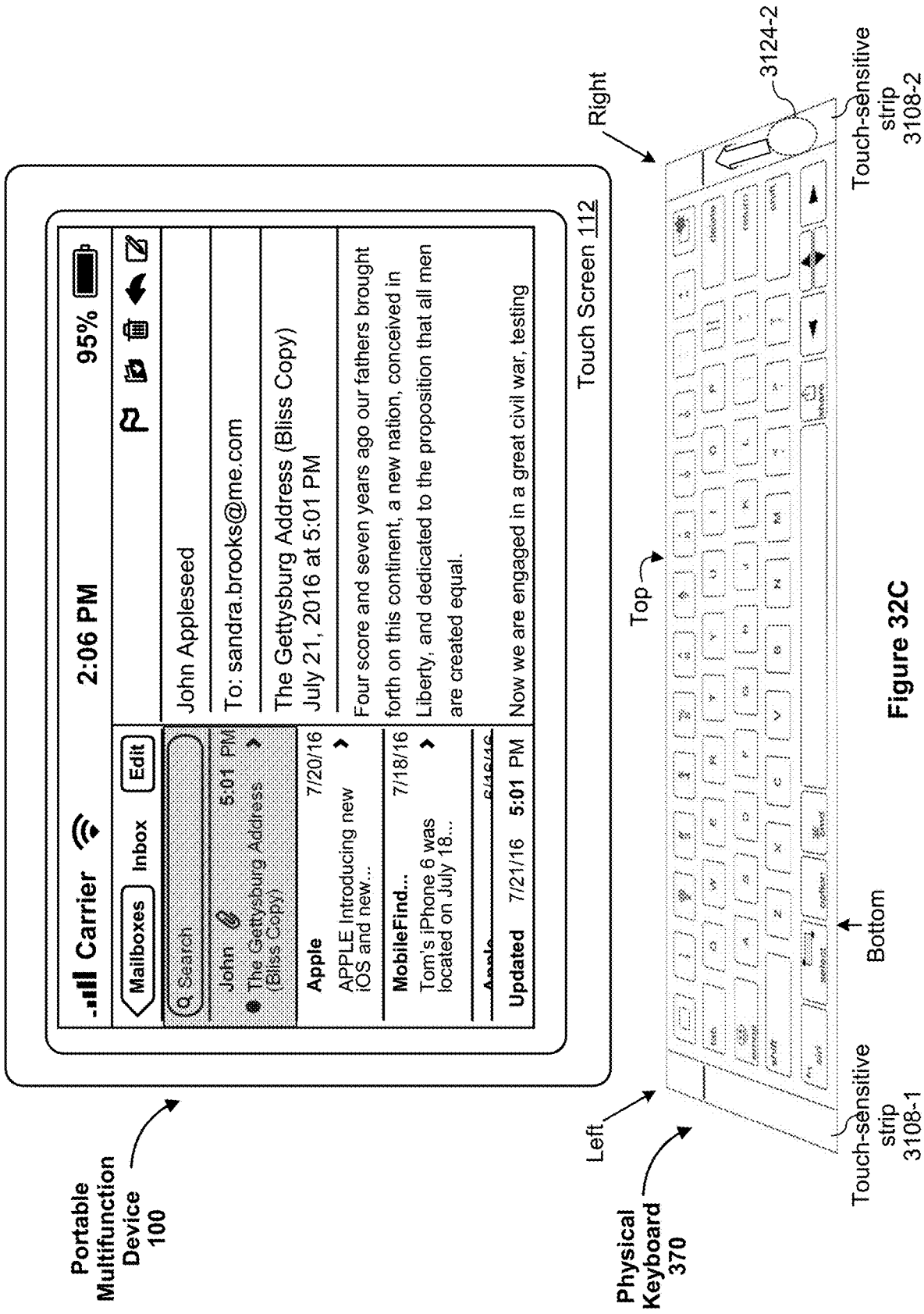

Portable Multifunction Device 100
Carrier
2:06 PM
95%
Mailboxes
Inbox
Edit
Search
John
5:01 PM
The Gettysburg Address (Bliss Copy)
Apple
7/20/16
APPLE Introducing new iOS and new...
MobileFind...
7/18/16
Tom's iPhone 6 was located on July 18...
Updated
7/21/16
5:01 PM
John Appleseed
To: sandra.brooks@me.com
The Gettysburg Address (Bliss Copy)
July 21, 2016 at 5:01 PM
Four score and seven years ago our fathers brought forth on this continent, a new nation, conceived in Liberty, and dedicated to the proposition that all men are created equal.
Now we are engaged in a great civil war, testing
Touch Screen 112
Physical Keyboard 370
Left
Right
Top
Bottom
3124-2
Touch-sensitive strip 3108-1
Touch-sensitive strip 3108-2

Figure 32C

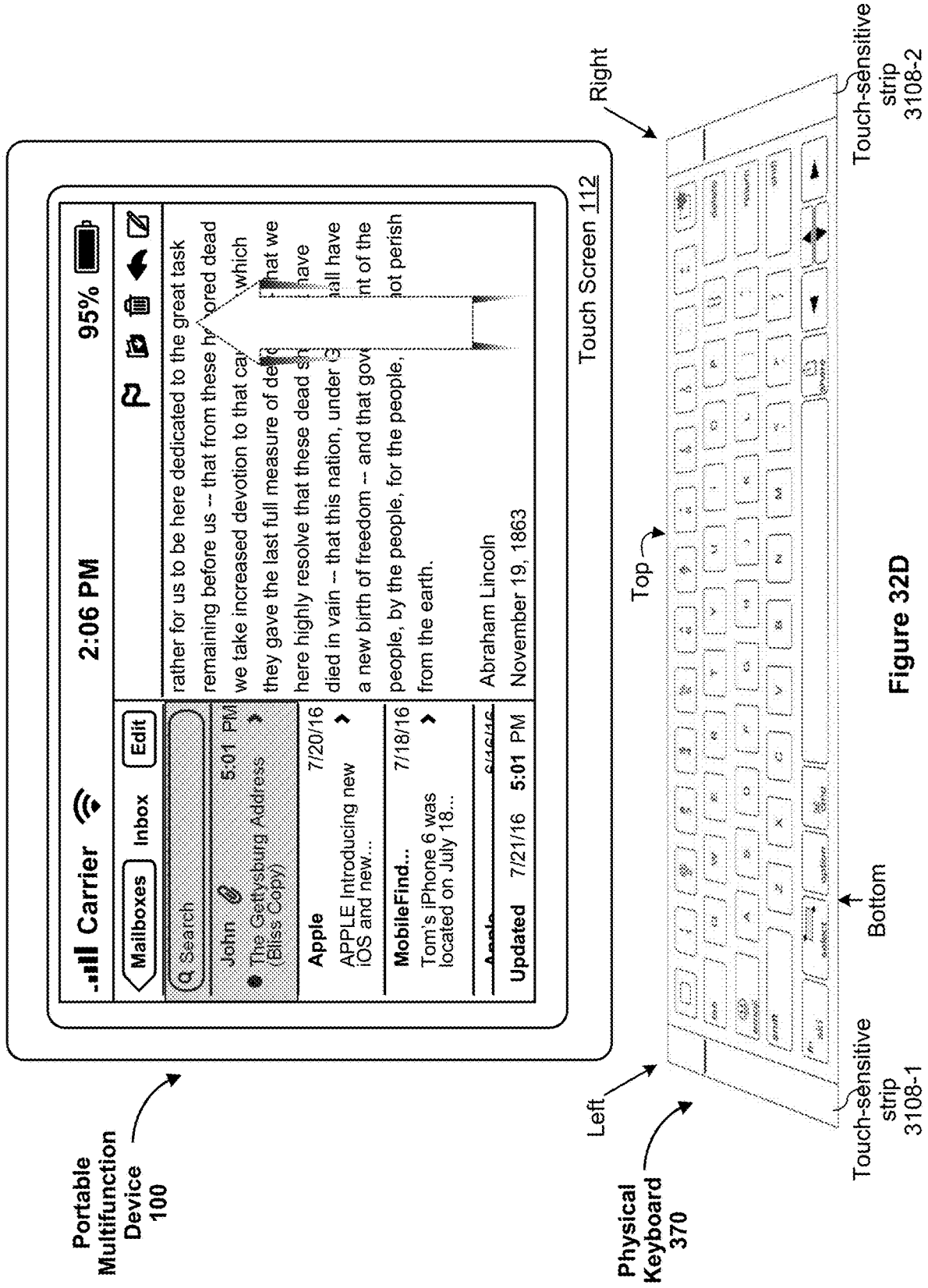

Portable Multifunction Device 100
Touch Screen 112
Carrier
2:06 PM
95%
Mailboxes
Inbox
Edit
Search
John
5:01 PM
The Gettysburg Address (Bliss Copy)
Apple
7/20/16
APPLE Introducing new iOS and new...
MobileFind...
7/18/16
Tom's iPhone 6 was located on July 18...
Updated 7/21/16 5:01 PM
rather for us to be here dedicated to the great task remaining before us -- that from these h ored dead we take increased devotion to that ca which they gave the last full measure of de hat we here highly resolve that these dead s have died in vain -- that this nation, under G all have a new birth of freedom -- and that gov nt of the people, by the people, for the people, ot perish from the earth.
Abraham Lincoln
November 19, 1863
Physical Keyboard 370
Left
Top
Right
Bottom
Touch-sensitive strip 3108-1
Touch-sensitive strip 3108-2

Figure 32D

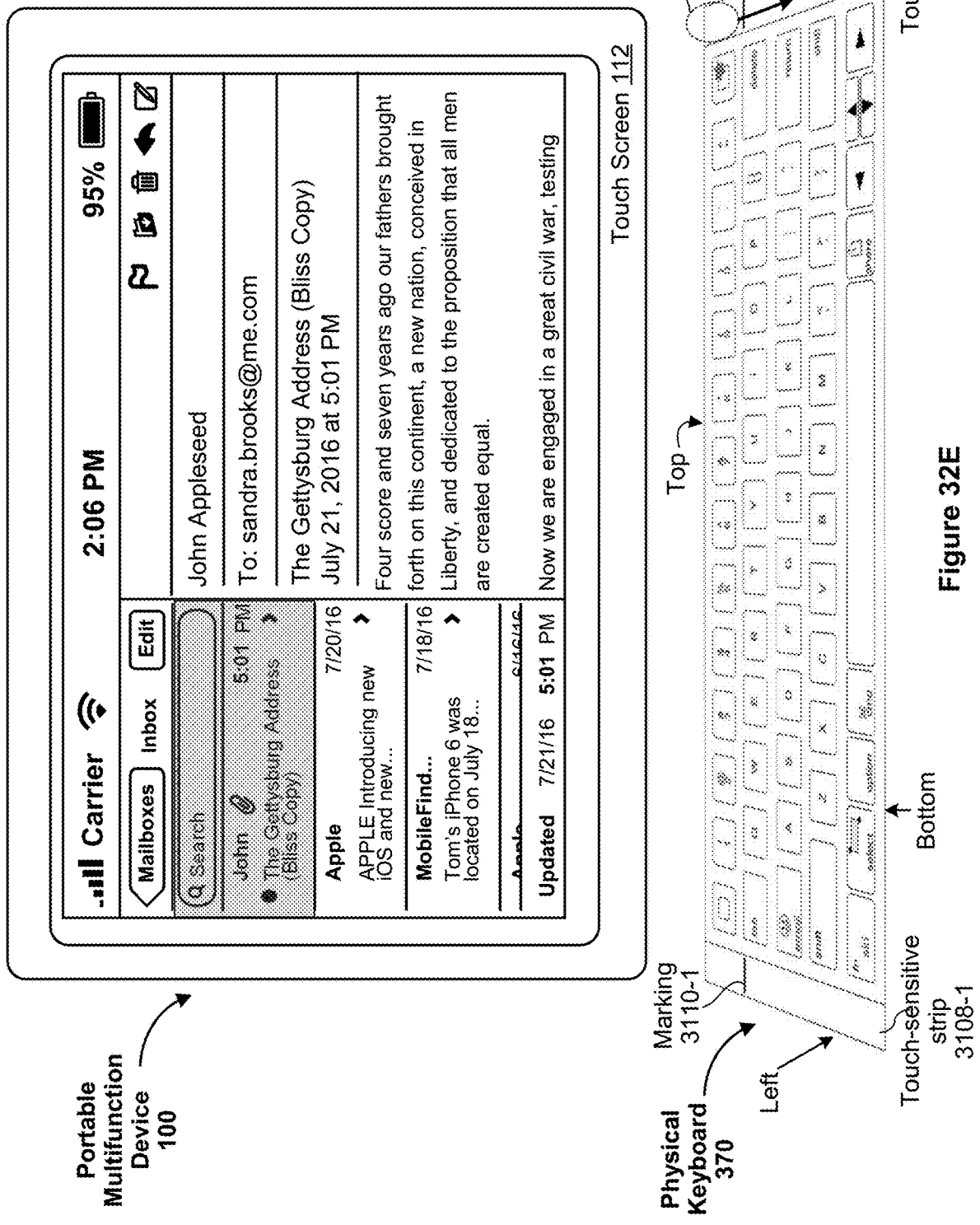

Portable Multifunction Device 100
Carrier
2:06 PM
95%
Mailboxes
Inbox
Edit
Search
John
5:01 PM
The Gettysburg Address (Bliss Copy)
Apple
7/20/16
APPLE Introducing new iOS and new...
MobileFind...
7/18/16
Tom's iPhone 6 was located on July 18...
Updated
7/21/16
5:01 PM
John Appleseed
To: sandra.brooks@me.com
The Gettysburg Address (Bliss Copy)
July 21, 2016 at 5:01 PM
Four score and seven years ago our fathers brought forth on this continent, a new nation, conceived in Liberty, and dedicated to the proposition that all men are created equal.
Now we are engaged in a great civil war, testing
Touch Screen 112
Physical Keyboard 370
Marking 3110-1
Left
Top
Bottom
Touch-sensitive strip 3108-1
3124-3
Marking 3110-2
Right
Touch-sensitive strip 3108-2

Figure 32E

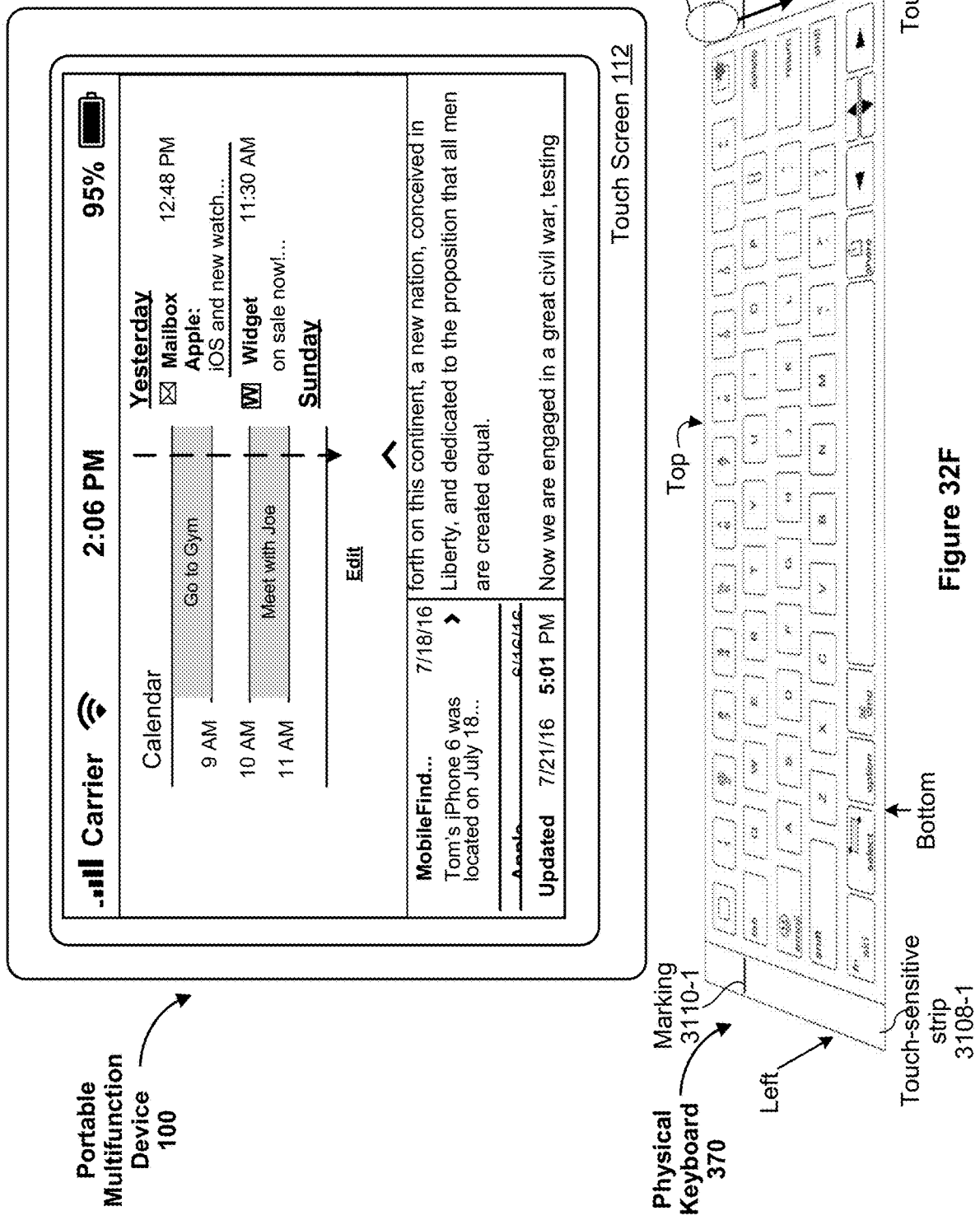

Portable Multifunction Device 100
Carrier
2:06 PM
95%
Calendar
Yesterday
Mailbox 12:48 PM
Apple:
iOS and new watch...
Widget 11:30 AM
on sale now!...
Sunday
9 AM
Go to Gym
10 AM
Meet with Joe
11 AM
Edit
MobileFind... 7/18/16
Tom's iPhone 6 was located on July 18...
Updated 7/21/16 5:01 PM
forth on this continent, a new nation, conceived in Liberty, and dedicated to the proposition that all men are created equal.
Now we are engaged in a great civil war, testing
Touch Screen 112
Physical Keyboard 370
Marking 3110-1
Left
Top
Bottom
Touch-sensitive strip 3108-1
3124-3 Marking 3110-2 Right
Touch-sensitive strip 3108-2

Figure 32F

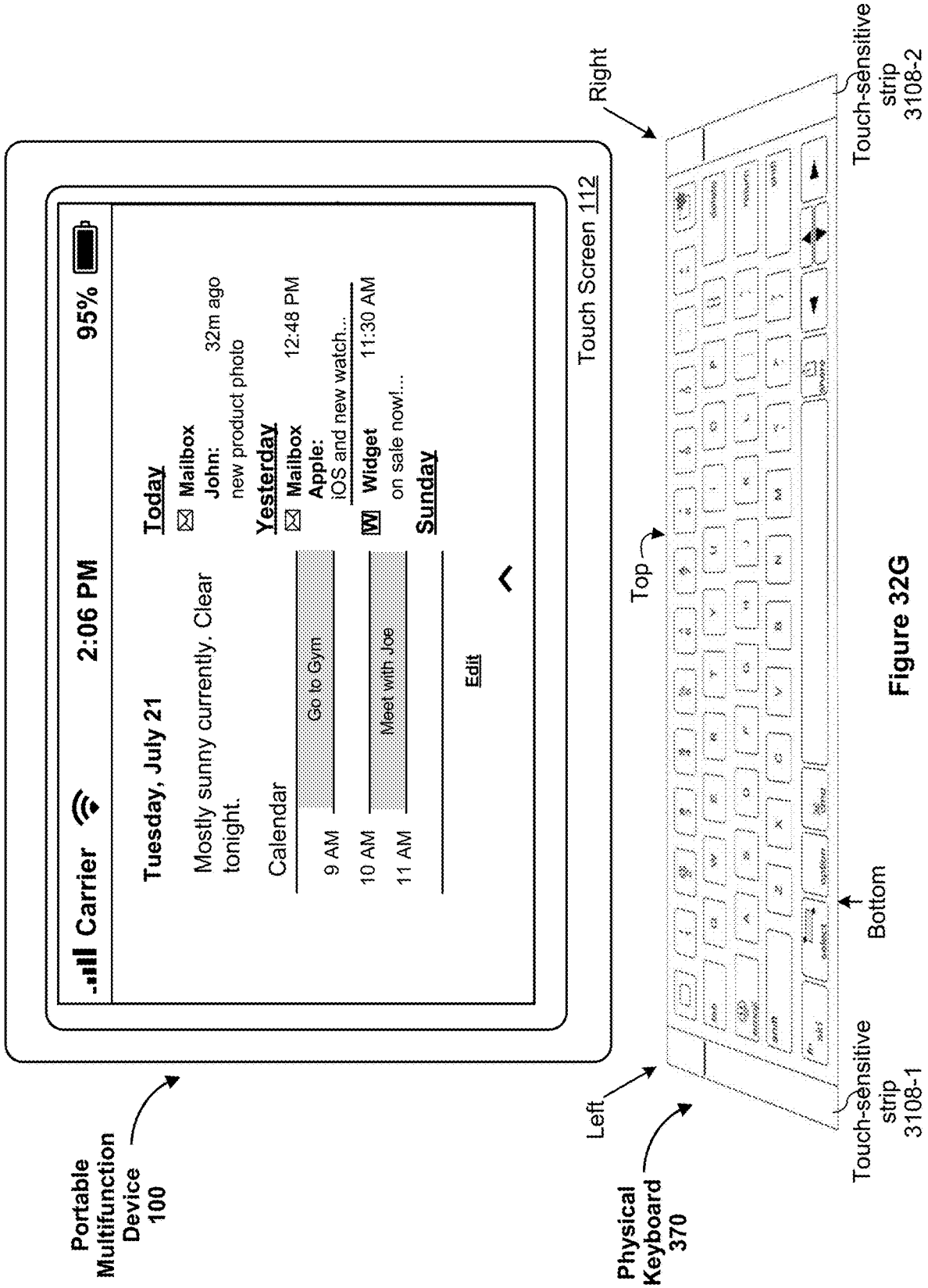

Portable Multifunction Device 100
Carrier
2:06 PM
95%
Tuesday, July 21
Mostly sunny currently. Clear tonight.
Calendar
9 AM
Go to Gym
10 AM
Meet with Joe
11 AM
Today
Mailbox
John:
32m ago
new product photo
Yesterday
Mailbox
12:48 PM
Apple:
iOS and new watch...
Widget
11:30 AM
on sale now!...
Sunday
Edit
Touch Screen 112
Physical Keyboard 370
Left
Right
Top
Bottom
Touch-sensitive strip 3108-1
Touch-sensitive strip 3108-2

Figure 32G

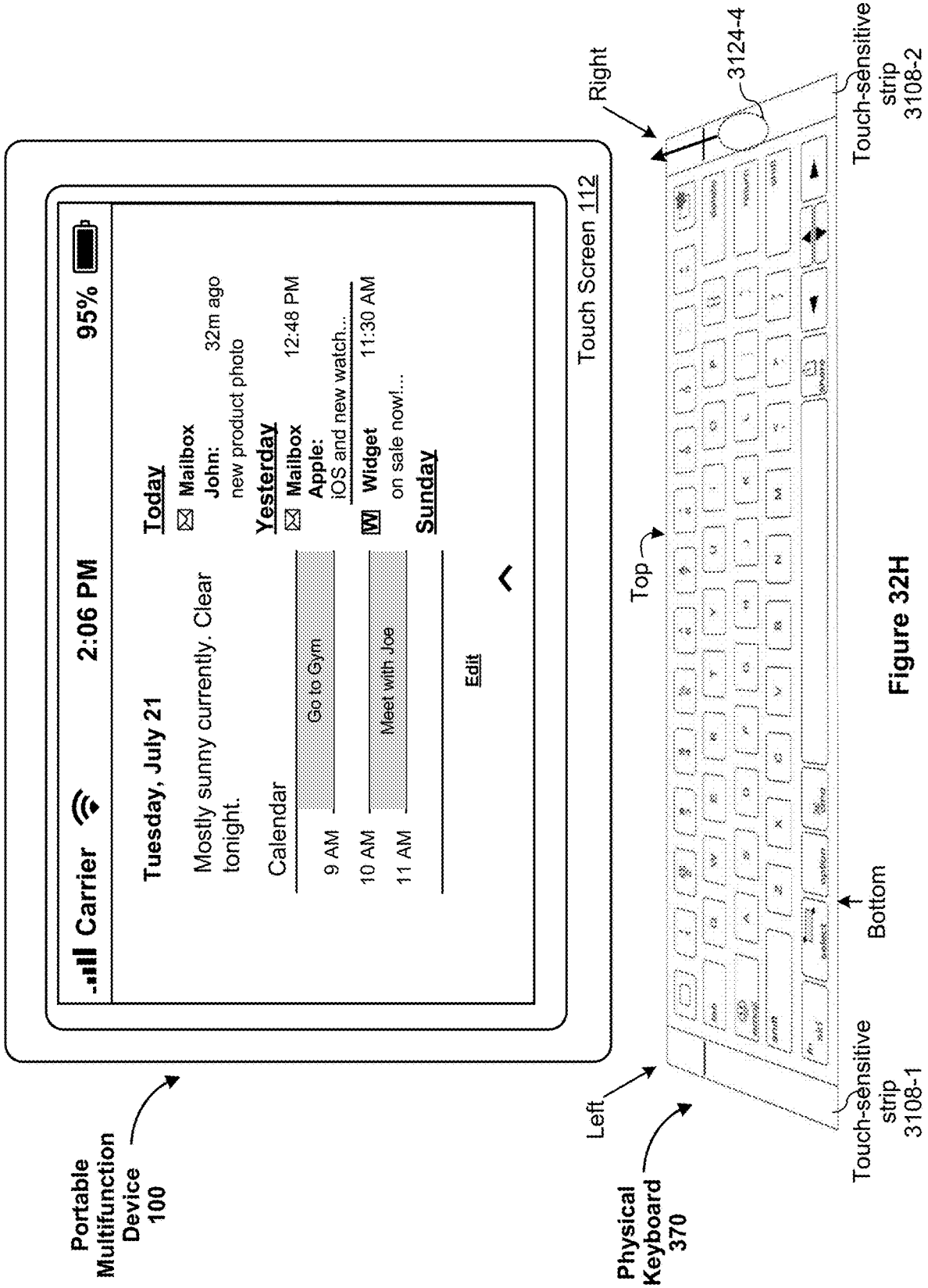

Portable Multifunction Device 100
Carrier
2:06 PM
95%
Tuesday, July 21
Mostly sunny currently. Clear tonight.
Today
Mailbox
John:
new product photo
32m ago
Yesterday
Mailbox
Apple:
iOS and new watch...
12:48 PM
Widget
on sale now!...
11:30 AM
Sunday
Calendar
9 AM
Go to Gym
10 AM
Meet with Joe
11 AM
Edit
Touch Screen 112
Physical Keyboard 370
Left
Right
Top
Bottom
3124-4
Touch-sensitive strip 3108-1
Touch-sensitive strip 3108-2

Figure 32H

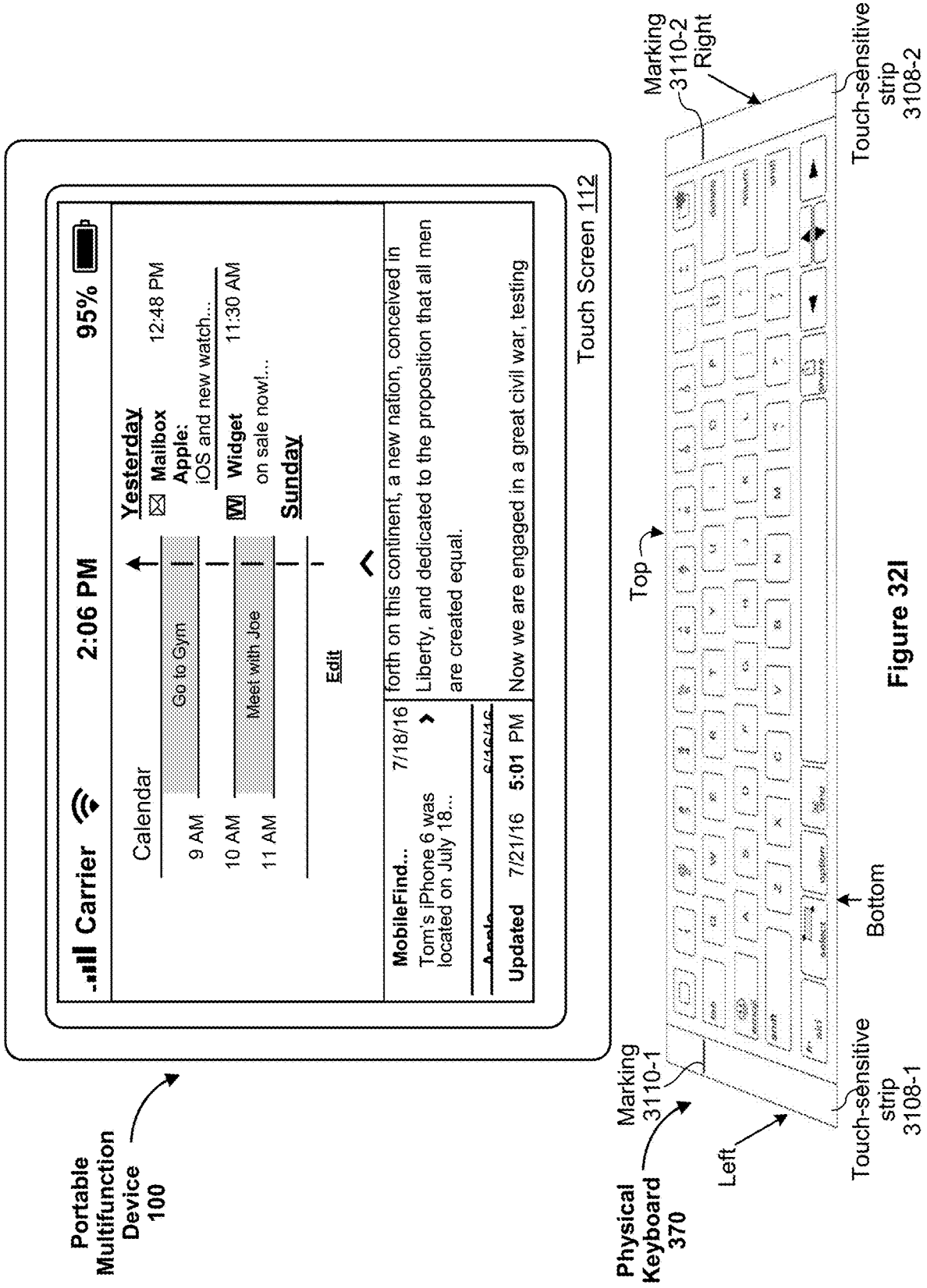

Portable Multifunction Device 100
Carrier
2:06 PM
95%
Calendar
9 AM
Go to Gym
10 AM
Meet with Joe
11 AM
Edit
Yesterday
Mailbox 12:48 PM
Apple:
iOS and new watch...
Widget 11:30 AM
on sale now!...
Sunday
MobileFind... 7/18/16
Tom's iPhone 6 was located on July 18...
Updated 7/21/16 5:01 PM
forth on this continent, a new nation, conceived in Liberty, and dedicated to the proposition that all men are created equal.
Now we are engaged in a great civil war, testing
Touch Screen 112
Physical Keyboard 370
Marking 3110-1
Left
Top
Bottom
Marking 3110-2 Right
Touch-sensitive strip 3108-1
Touch-sensitive strip 3108-2

Figure 32I

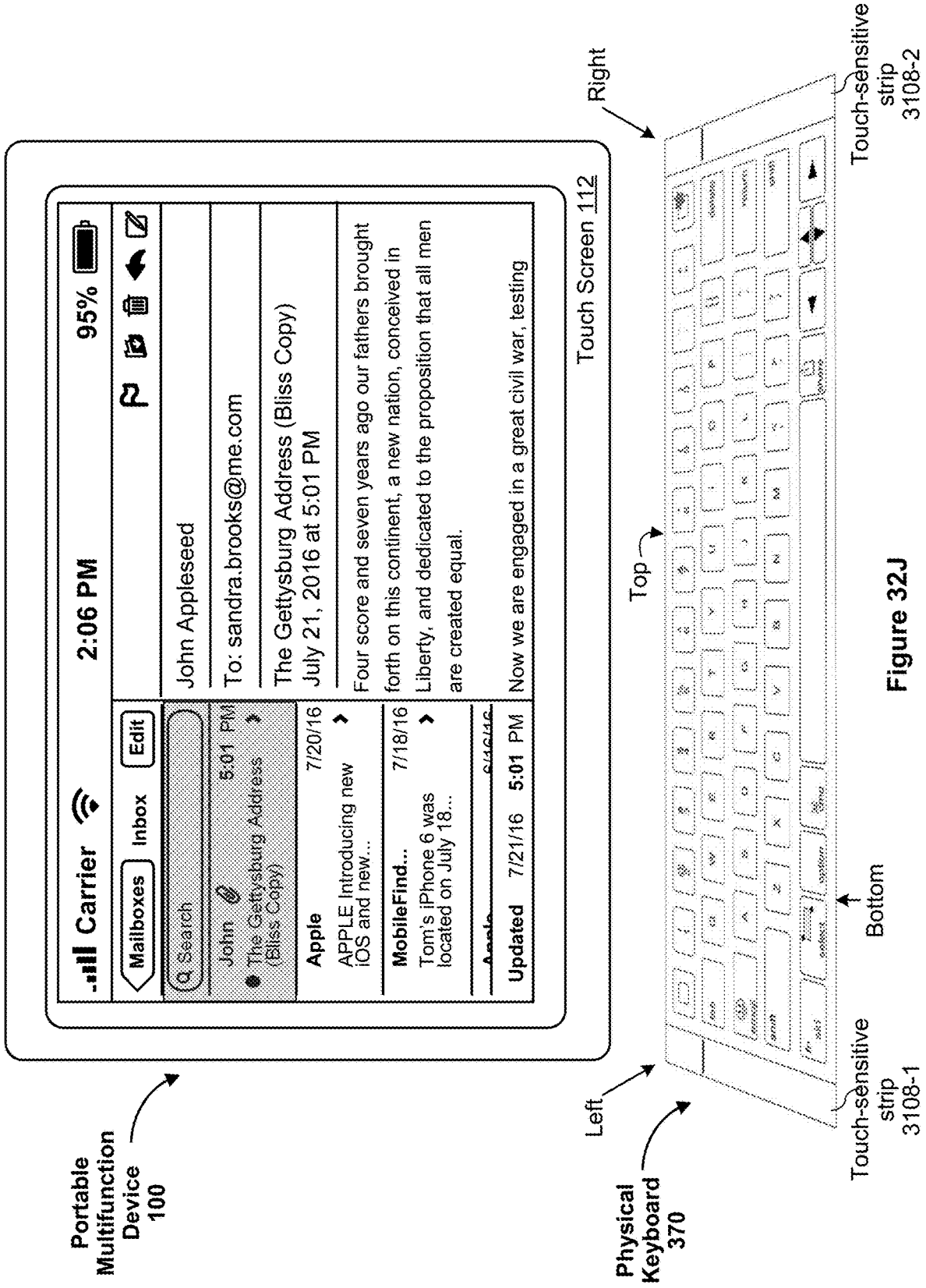

Portable Multifunction Device 100
Carrier
2:06 PM
95%
Mailboxes
Inbox
Edit
Search
John
5:01 PM
The Gettysburg Address (Bliss Copy)
Apple
7/20/16
APPLE Introducing new iOS and new...
MobileFind...
7/18/16
Tom's iPhone 6 was located on July 18...
Updated
7/21/16
5:01 PM
John Appleseed
To: sandra.brooks@me.com
The Gettysburg Address (Bliss Copy)
July 21, 2016 at 5:01 PM
Four score and seven years ago our fathers brought forth on this continent, a new nation, conceived in Liberty, and dedicated to the proposition that all men are created equal.
Now we are engaged in a great civil war, testing
Touch Screen 112
Physical Keyboard 370
Left
Right
Top
Bottom
Touch-sensitive strip 3108-1
Touch-sensitive strip 3108-2

Figure 32J

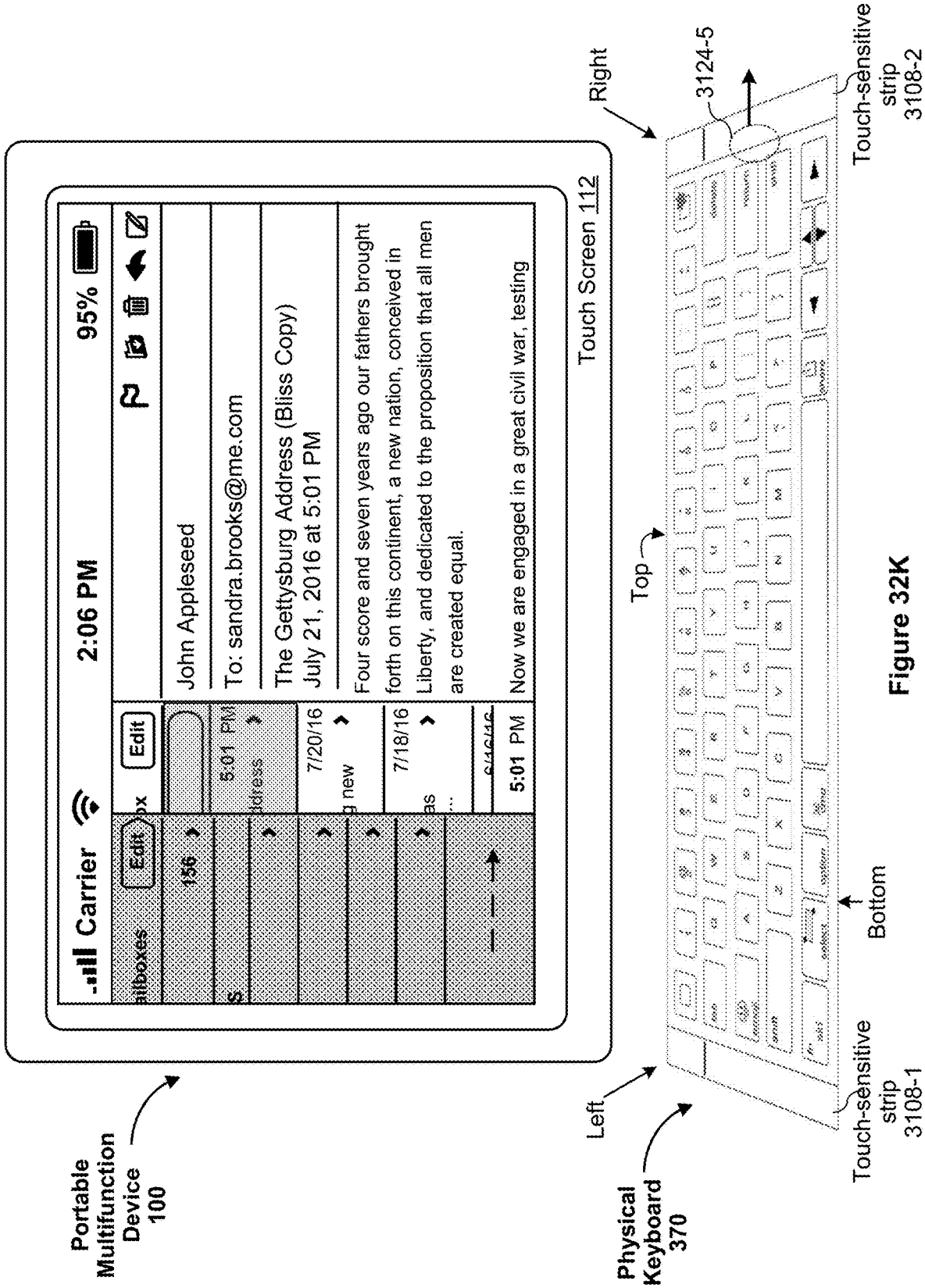

Portable Multifunction Device 100
Carrier
2:06 PM
95%
Edit
John Appleseed
To: sandra.brooks@me.com
The Gettysburg Address (Bliss Copy)
July 21, 2016 at 5:01 PM
Four score and seven years ago our fathers brought forth on this continent, a new nation, conceived in Liberty, and dedicated to the proposition that all men are created equal.
Now we are engaged in a great civil war, testing
5:01 PM
Touch Screen 112
Physical Keyboard 370
Left
Right
Top
Bottom
3124-5
Touch-sensitive strip 3108-1
Touch-sensitive strip 3108-2

Figure 32K

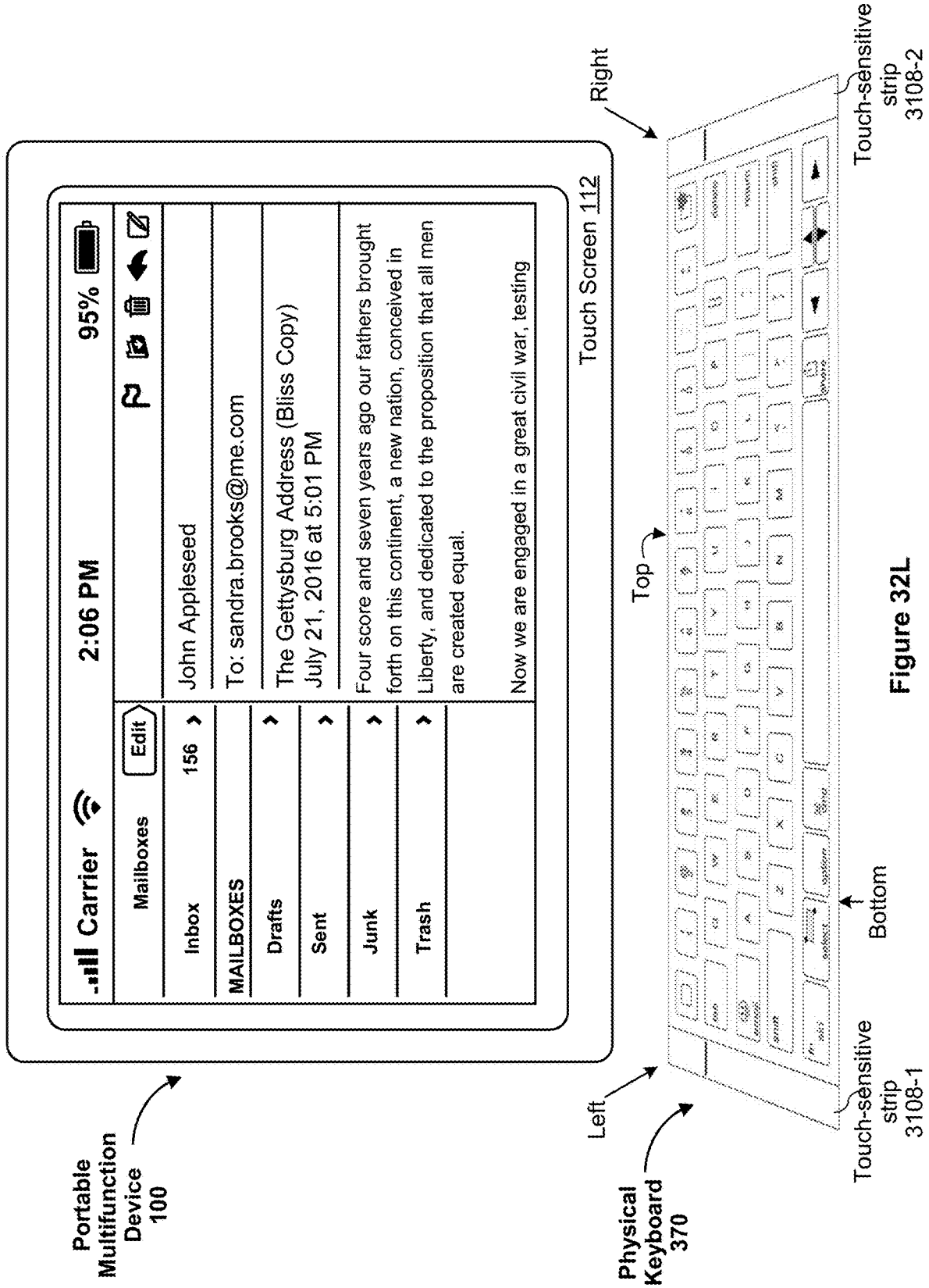

Portable Multifunction Device 100
Carrier
2:06 PM
95%
Mailboxes
Edit
Inbox 156
MAILBOXES
Drafts
Sent
Junk
Trash
John Appleseed
To: sandra.brooks@me.com
The Gettysburg Address (Bliss Copy)
July 21, 2016 at 5:01 PM
Four score and seven years ago our fathers brought forth on this continent, a new nation, conceived in Liberty, and dedicated to the proposition that all men are created equal.
Now we are engaged in a great civil war, testing
Touch Screen 112
Physical Keyboard 370
Left
Right
Top
Bottom
Touch-sensitive strip 3108-1
Touch-sensitive strip 3108-2

Figure 32L

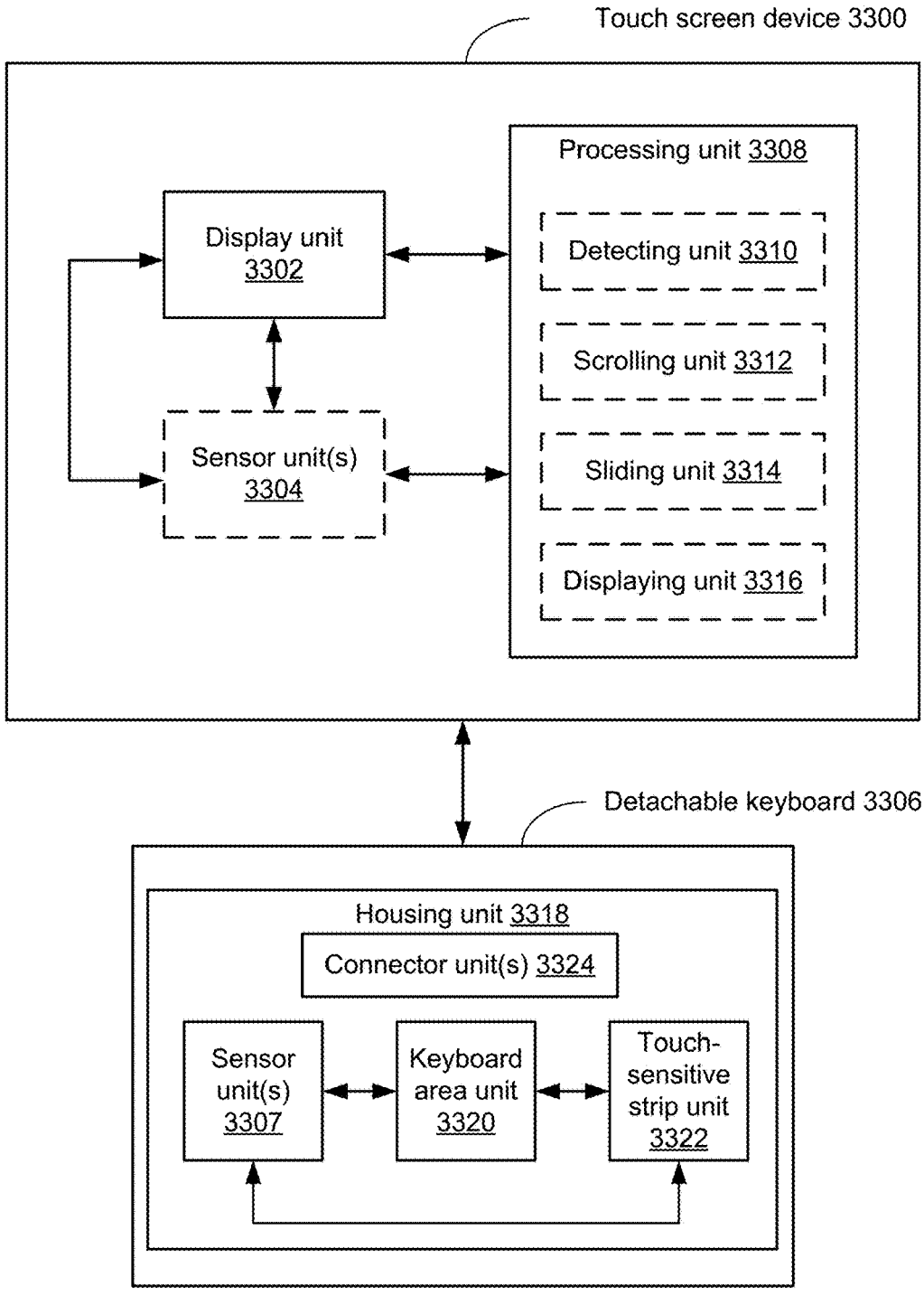

Touch screen device 3300
Processing unit 3308
Display unit 3302
Detecting unit 3310
Scrolling unit 3312
Sensor unit(s) 3304
Sliding unit 3314
Displaying unit 3316
Detachable keyboard 3306
Housing unit 3318
Connector unit(s) 3324
Sensor unit(s) 3307
Keyboard area unit 3320
Touch-sensitive strip unit 3322

Figure 33

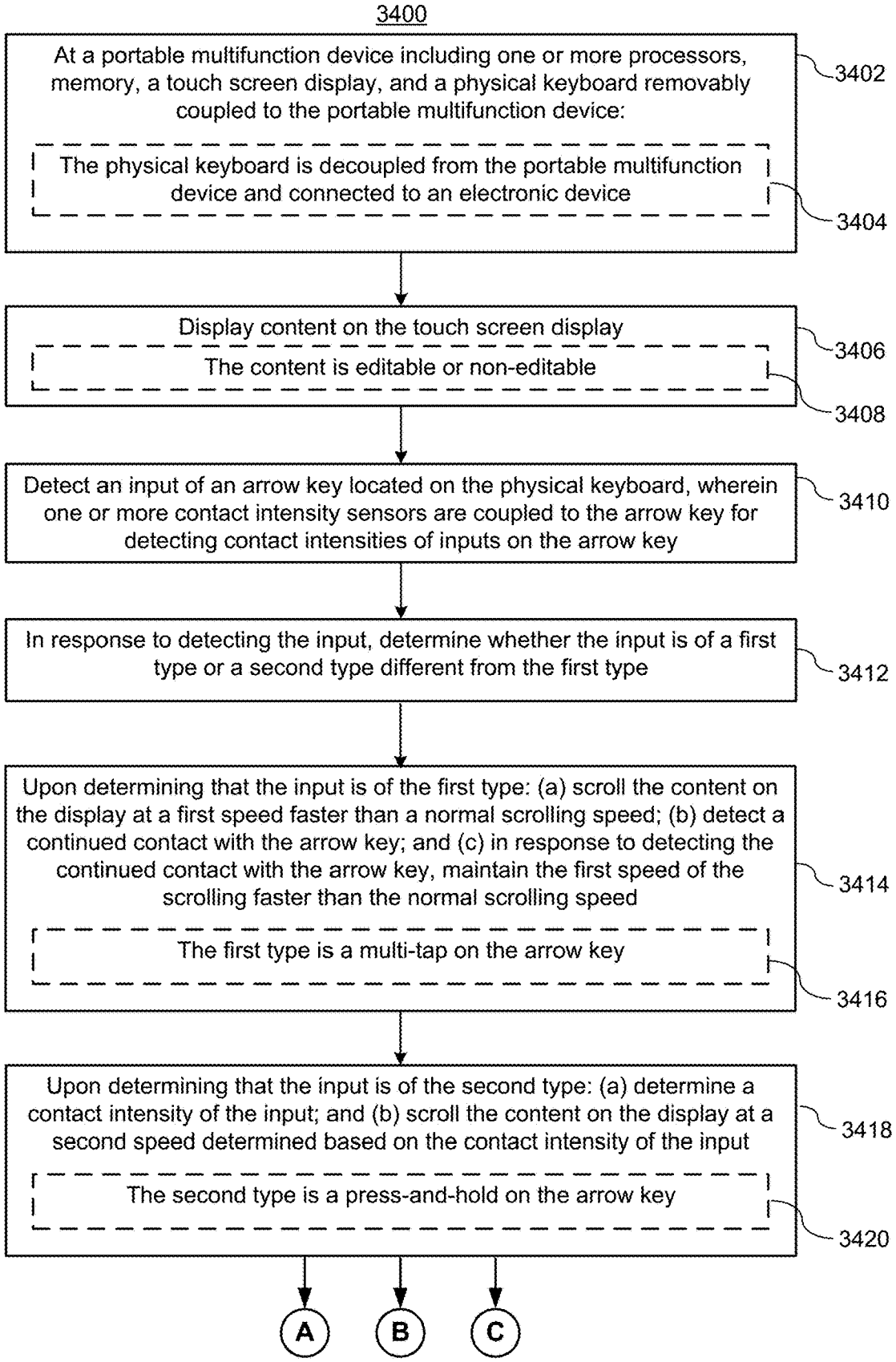

3400
At a portable multifunction device including one or more processors, memory, a touch screen display, and a physical keyboard removably coupled to the portable multifunction device:
3402
The physical keyboard is decoupled from the portable multifunction device and connected to an electronic device
3404
Display content on the touch screen display
3406
The content is editable or non-editable
3408
Detect an input of an arrow key located on the physical keyboard, wherein one or more contact intensity sensors are coupled to the arrow key for detecting contact intensities of inputs on the arrow key
3410
In response to detecting the input, determine whether the input is of a first type or a second type different from the first type
3412
Upon determining that the input is of the first type: (a) scroll the content on the display at a first speed faster than a normal scrolling speed; (b) detect a continued contact with the arrow key; and (c) in response to detecting the continued contact with the arrow key, maintain the first speed of the scrolling faster than the normal scrolling speed
3414
The first type is a multi-tap on the arrow key
3416
Upon determining that the input is of the second type: (a) determine a contact intensity of the input; and (b) scroll the content on the display at a second speed determined based on the contact intensity of the input
3418
The second type is a press-and-hold on the arrow key
3420
A
B
C

Figure 34A

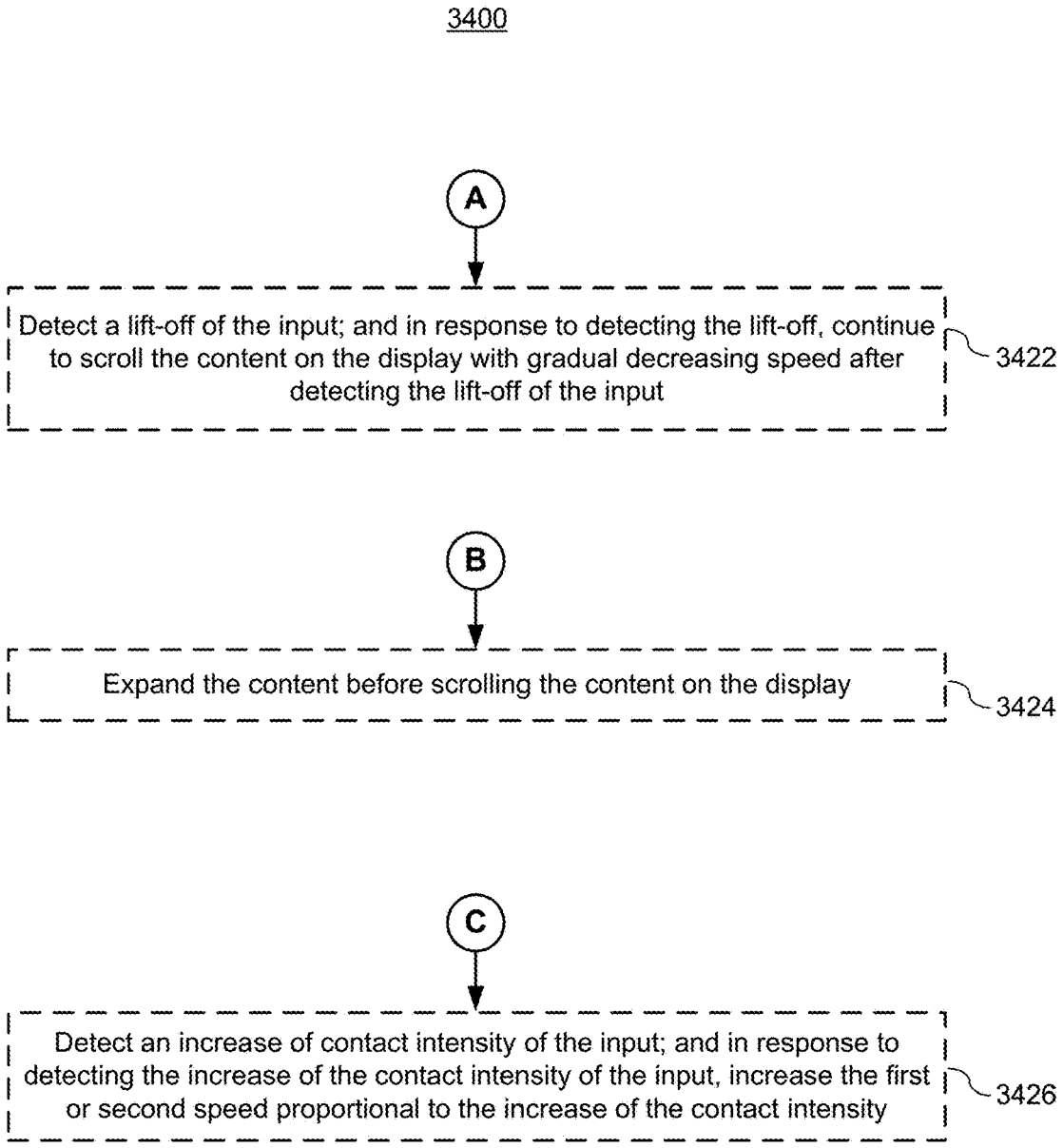

3400
A
Detect a lift-off of the input; and in response to detecting the lift-off, continue to scroll the content on the display with gradual decreasing speed after detecting the lift-off of the input
3422
B
Expand the content before scrolling the content on the display
3424
C
Detect an increase of contact intensity of the input; and in response to detecting the increase of the contact intensity of the input, increase the first or second speed proportional to the increase of the contact intensity
3426

Figure 34B

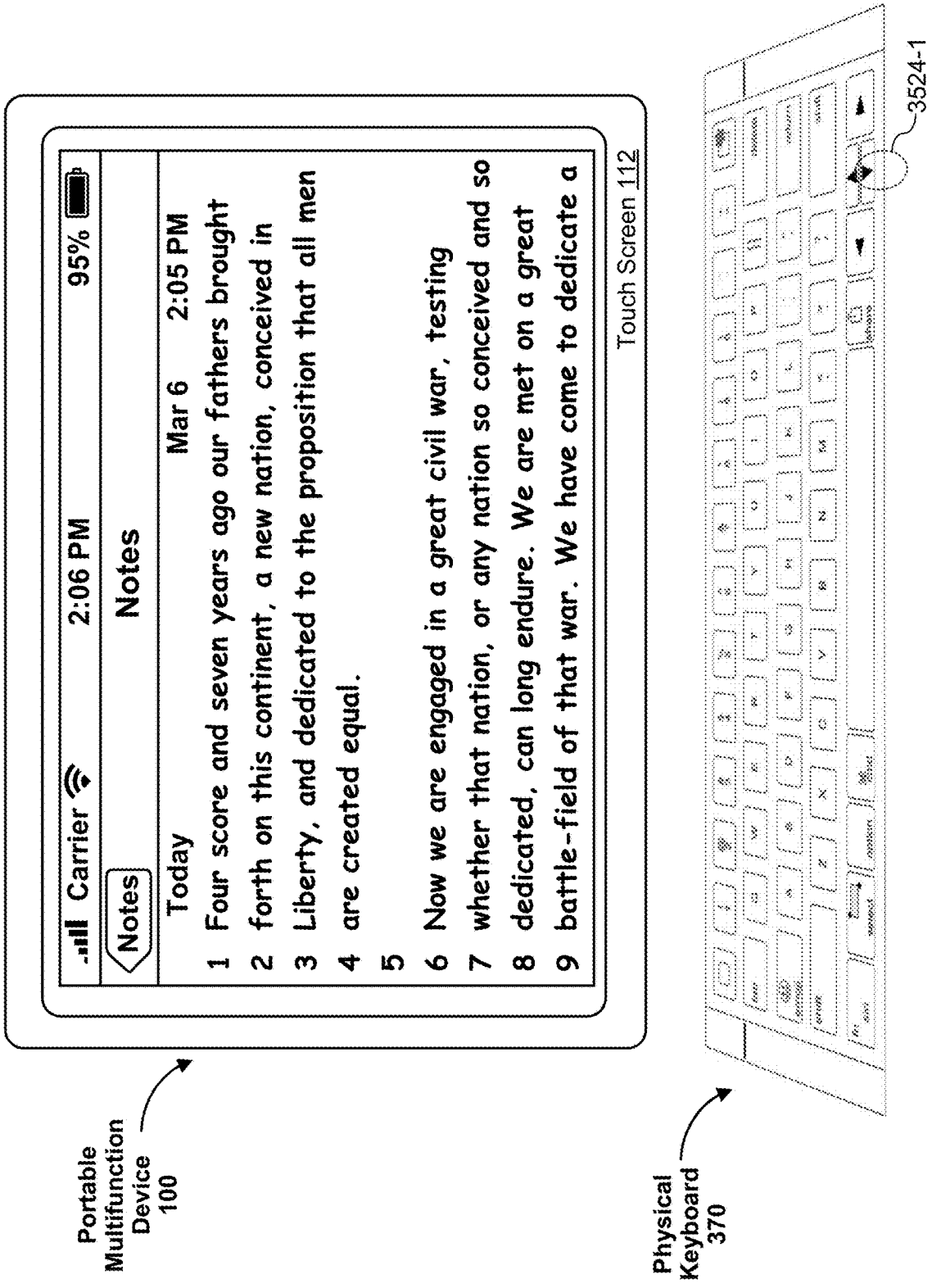

Portable Multifunction Device 100
Carrier
2:06 PM
95%
Notes
Notes
Today
Mar 6 2:05 PM
1 Four score and seven years ago our fathers brought
2 forth on this continent, a new nation, conceived in
3 Liberty, and dedicated to the proposition that all men
4 are created equal.
5
6 Now we are engaged in a great civil war, testing
7 whether that nation, or any nation so conceived and so
8 dedicated, can long endure. We are met on a great
9 battle-field of that war. We have come to dedicate a
Touch Screen 112
Physical Keyboard 370
3524-1

Figure 35A

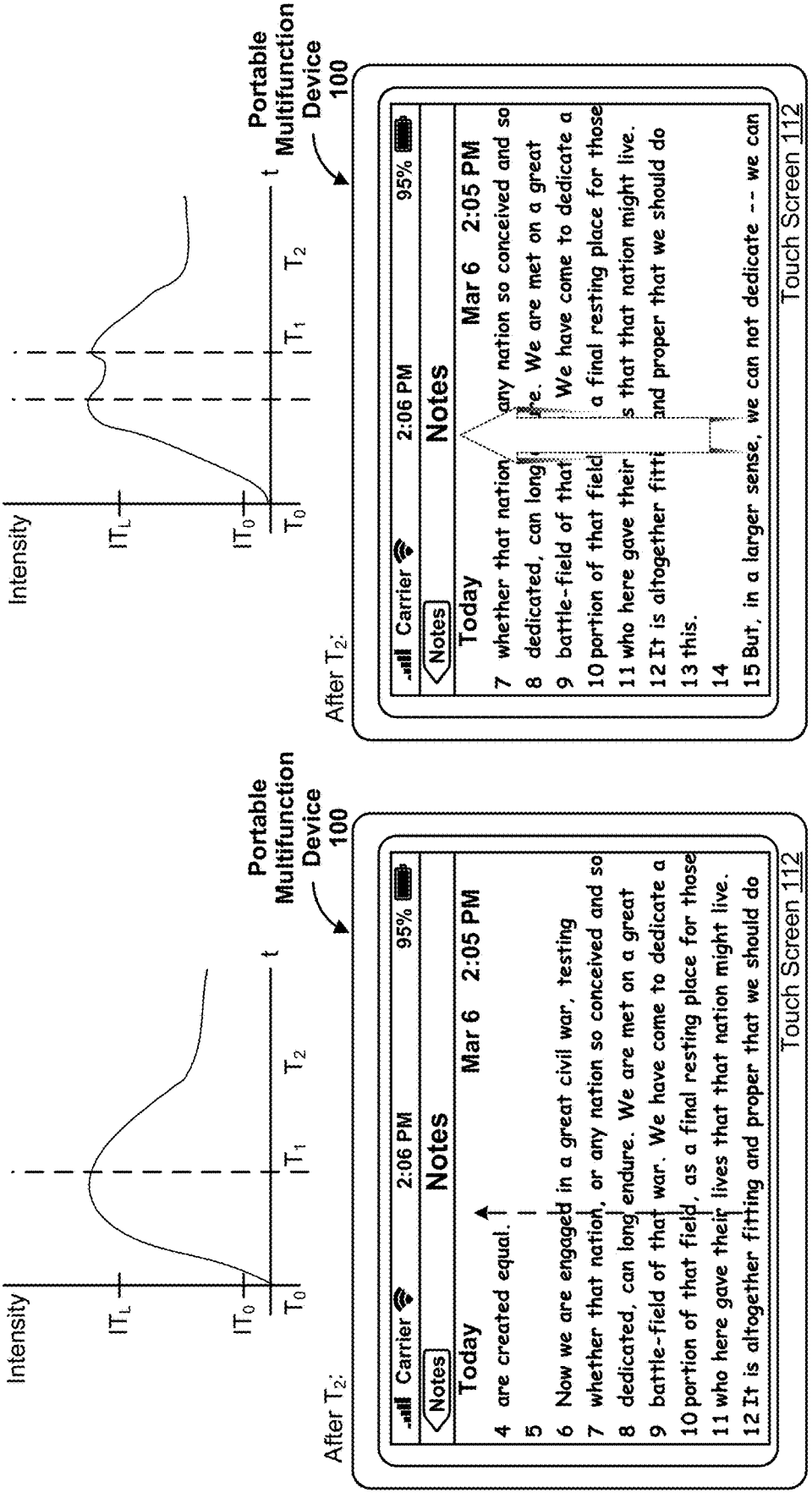


Figure 35B

Figure 35C

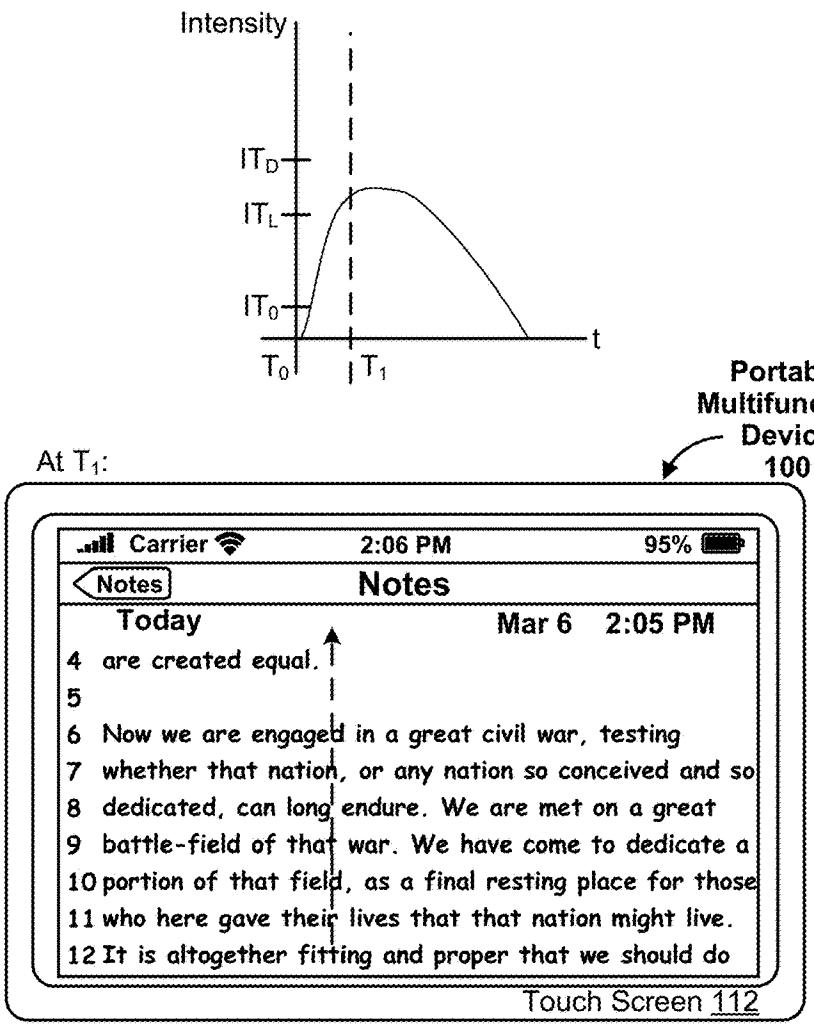


Figure 35D

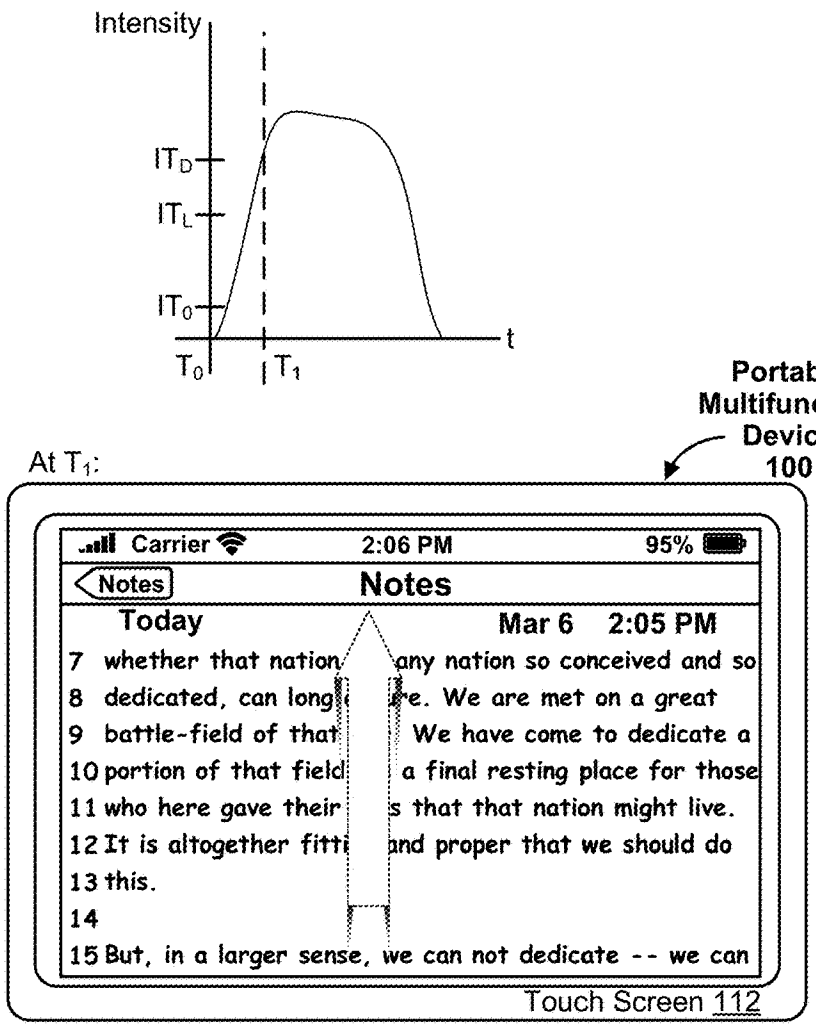


Figure 35E

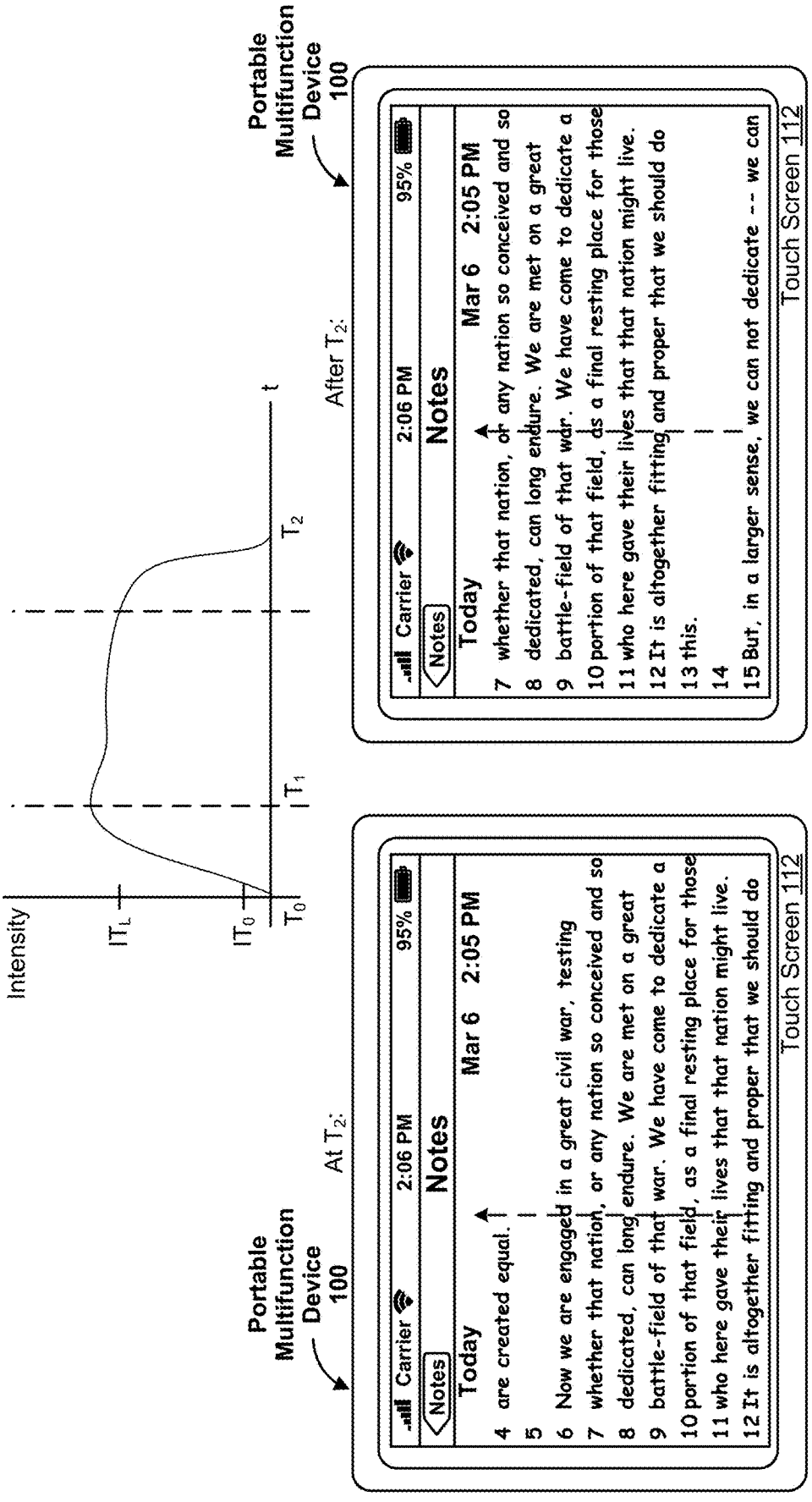

Intensity
IT_L
IT_0
T_0
T_1
T_2
t
At T_2:
Portable Multifunction Device 100
Carrier
2:06 PM
95%
Notes
Today
Mar 6 2:05 PM
4 are created equal.
5
6 Now we are engaged in a great civil war, testing
7 whether that nation, or any nation so conceived and so
8 dedicated, can long endure. We are met on a great
9 battle-field of that war. We have come to dedicate a
10 portion of that field, as a final resting place for those
11 who here gave their lives that that nation might live.
12 It is altogether fitting and proper that we should do
Touch Screen 112
After T_2:
Portable Multifunction Device 100
Carrier
2:06 PM
95%
Notes
Today
Mar 6 2:05 PM
7 whether that nation, or any nation so conceived and so
8 dedicated, can long endure. We are met on a great
9 battle-field of that war. We have come to dedicate a
10 portion of that field, as a final resting place for those
11 who here gave their lives that that nation might live.
12 It is altogether fitting and proper that we should do
13 this.
14
15 But, in a larger sense, we can not dedicate -- we can
Touch Screen 112

Figure 35F

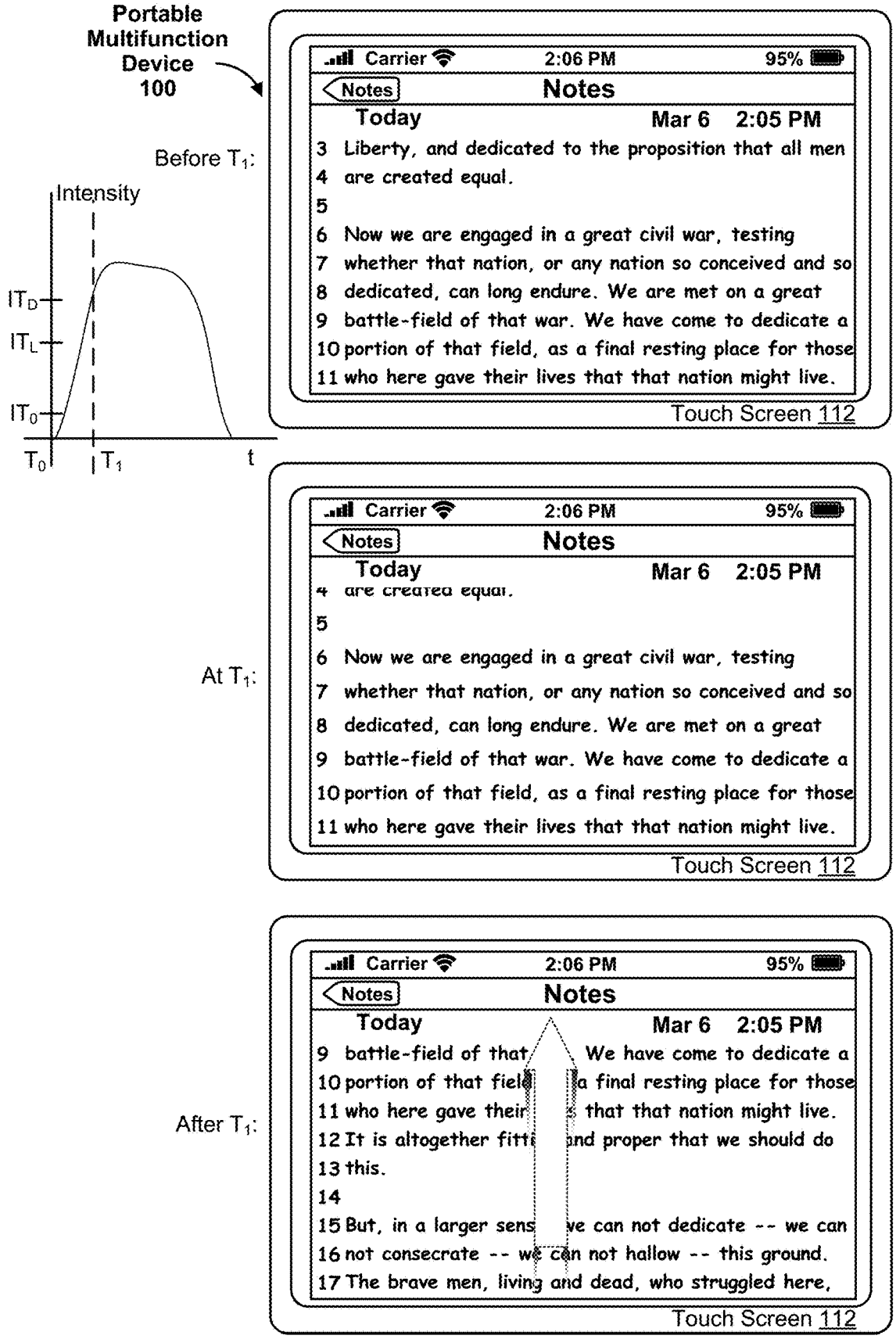

Portable Multifunction Device 100
Before T_1:
Intensity
IT_D
IT_L
IT_0
T_0
T_1
t
Carrier 2:06 PM 95%
Notes
Notes
Today Mar 6 2:05 PM
3 Liberty, and dedicated to the proposition that all men
4 are created equal.
5
6 Now we are engaged in a great civil war, testing
7 whether that nation, or any nation so conceived and so
8 dedicated, can long endure. We are met on a great
9 battle-field of that war. We have come to dedicate a
10 portion of that field, as a final resting place for those
11 who here gave their lives that that nation might live.
Touch Screen 112
At T_1:
Carrier 2:06 PM 95%
Notes
Notes
Today Mar 6 2:05 PM
4 are created equal.
5
6 Now we are engaged in a great civil war, testing
7 whether that nation, or any nation so conceived and so
8 dedicated, can long endure. We are met on a great
9 battle-field of that war. We have come to dedicate a
10 portion of that field, as a final resting place for those
11 who here gave their lives that that nation might live.
Touch Screen 112
After T_1:
Carrier 2:06 PM 95%
Notes
Notes
Today Mar 6 2:05 PM
9 battle-field of that We have come to dedicate a
10 portion of that fiel a final resting place for those
11 who here gave their that that nation might live.
12 It is altogether fitt nd proper that we should do
13 this.
14
15 But, in a larger sens e can not dedicate -- we can
16 not consecrate -- we can not hallow -- this ground.
17 The brave men, living and dead, who struggled here,
Touch Screen 112

Figure 35G

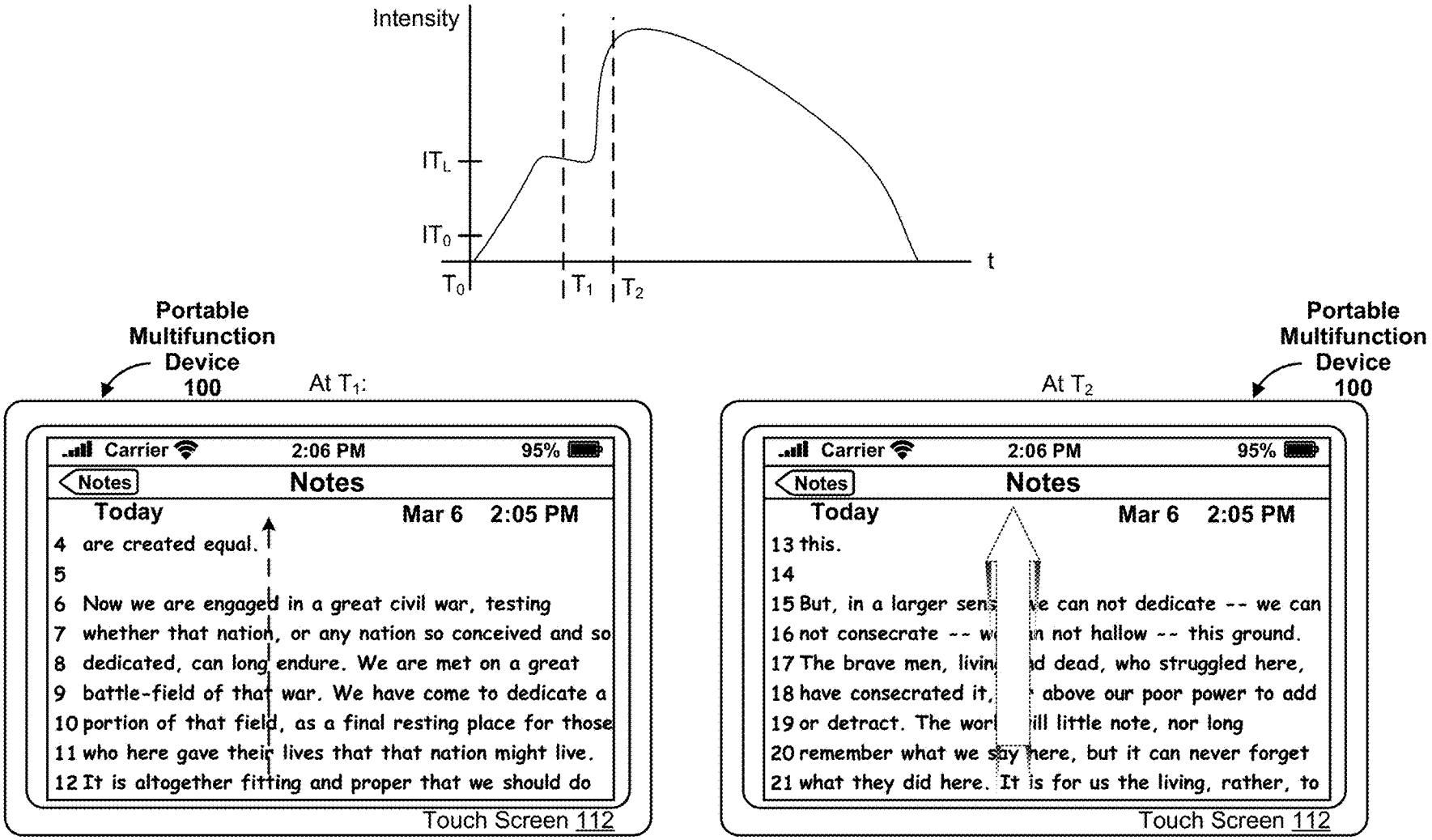

Intensity
IT_L
IT_0
T_0
T_1
T_2
t
Portable Multifunction Device 100
At T_1:
Carrier
2:06 PM
95%
Notes
Notes
Today
Mar 6 2:05 PM
4 are created equal.
5
6 Now we are engaged in a great civil war, testing
7 whether that nation, or any nation so conceived and so
8 dedicated, can long endure. We are met on a great
9 battle-field of that war. We have come to dedicate a
10 portion of that field, as a final resting place for those
11 who here gave their lives that that nation might live.
12 It is altogether fitting and proper that we should do
Touch Screen 112
At T_2
Portable Multifunction Device 100
Carrier
2:06 PM
95%
Notes
Notes
Today
Mar 6 2:05 PM
13 this.
14
15 But, in a larger sens e can not dedicate -- we can
16 not consecrate -- w n not hallow -- this ground.
17 The brave men, livin d dead, who struggled here,
18 have consecrated it, above our poor power to add
19 or detract. The wor ill little note, nor long
20 remember what we say here, but it can never forget
21 what they did here. It is for us the living, rather, to
Touch Screen 112

Figure 35H

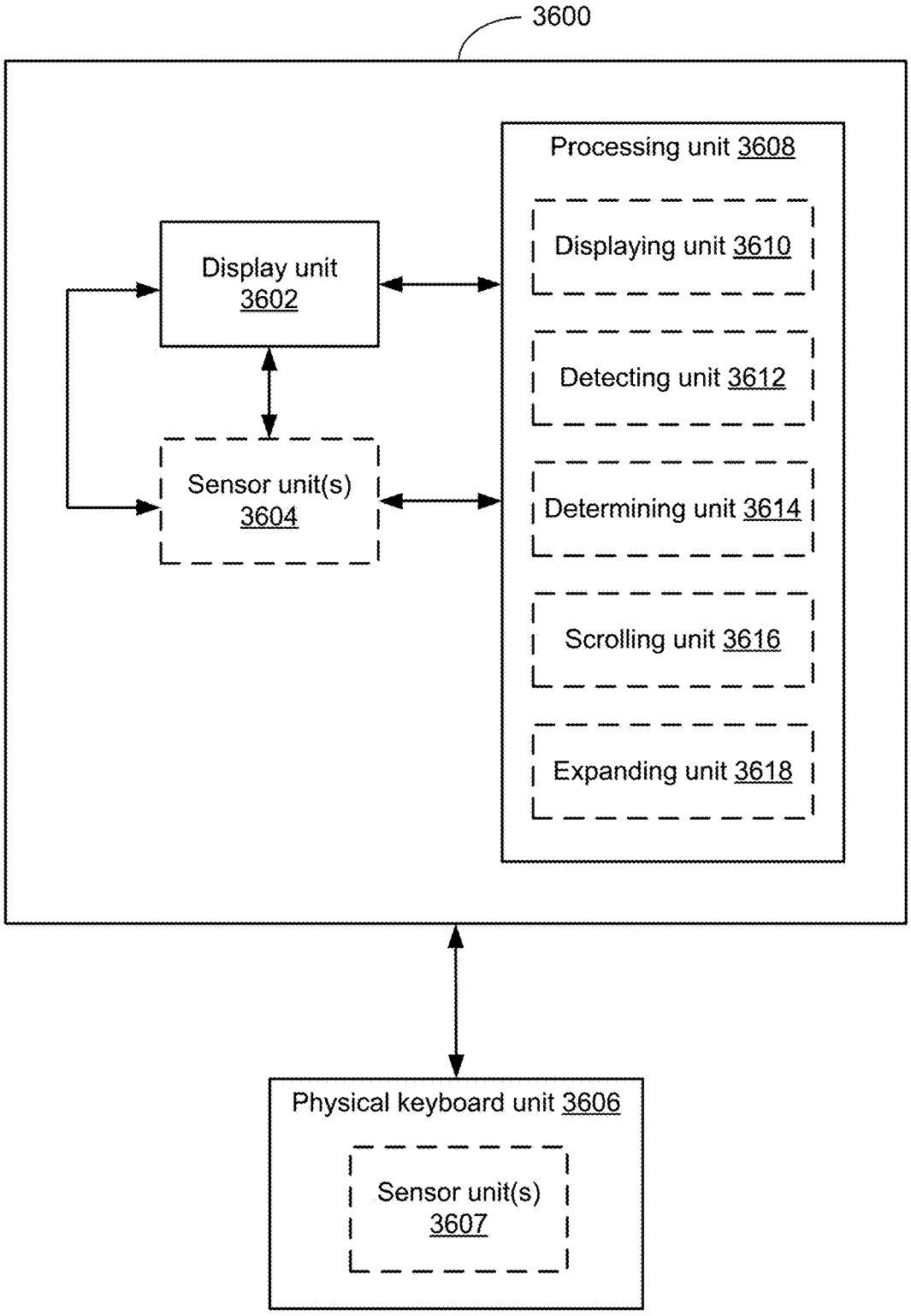

3600
Processing unit 3608
Displaying unit 3610
Detecting unit 3612
Determining unit 3614
Scrolling unit 3616
Expanding unit 3618
Display unit 3602
Sensor unit(s) 3604
Physical keyboard unit 3606
Sensor unit(s) 3607

Figure 36

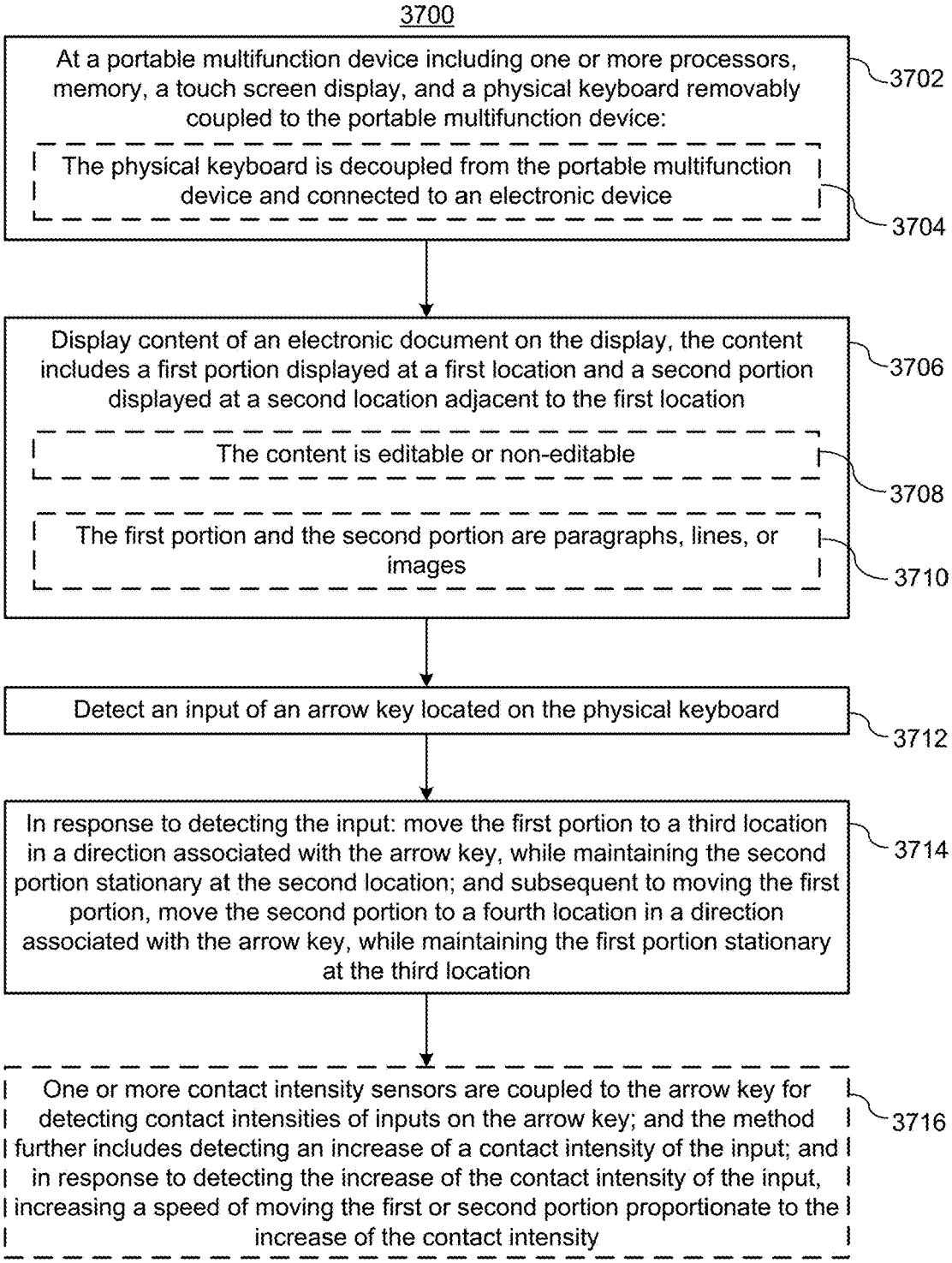

3700
At a portable multifunction device including one or more processors, memory, a touch screen display, and a physical keyboard removably coupled to the portable multifunction device:
3702
The physical keyboard is decoupled from the portable multifunction device and connected to an electronic device
3704
Display content of an electronic document on the display, the content includes a first portion displayed at a first location and a second portion displayed at a second location adjacent to the first location
3706
The content is editable or non-editable
3708
The first portion and the second portion are paragraphs, lines, or images
3710
Detect an input of an arrow key located on the physical keyboard
3712
In response to detecting the input: move the first portion to a third location in a direction associated with the arrow key, while maintaining the second portion stationary at the second location; and subsequent to moving the first portion, move the second portion to a fourth location in a direction associated with the arrow key, while maintaining the first portion stationary at the third location
3714
One or more contact intensity sensors are coupled to the arrow key for detecting contact intensities of inputs on the arrow key; and the method further includes detecting an increase of a contact intensity of the input; and in response to detecting the increase of the contact intensity of the input, increasing a speed of moving the first or second portion proportionate to the increase of the contact intensity
3716

Figure 37

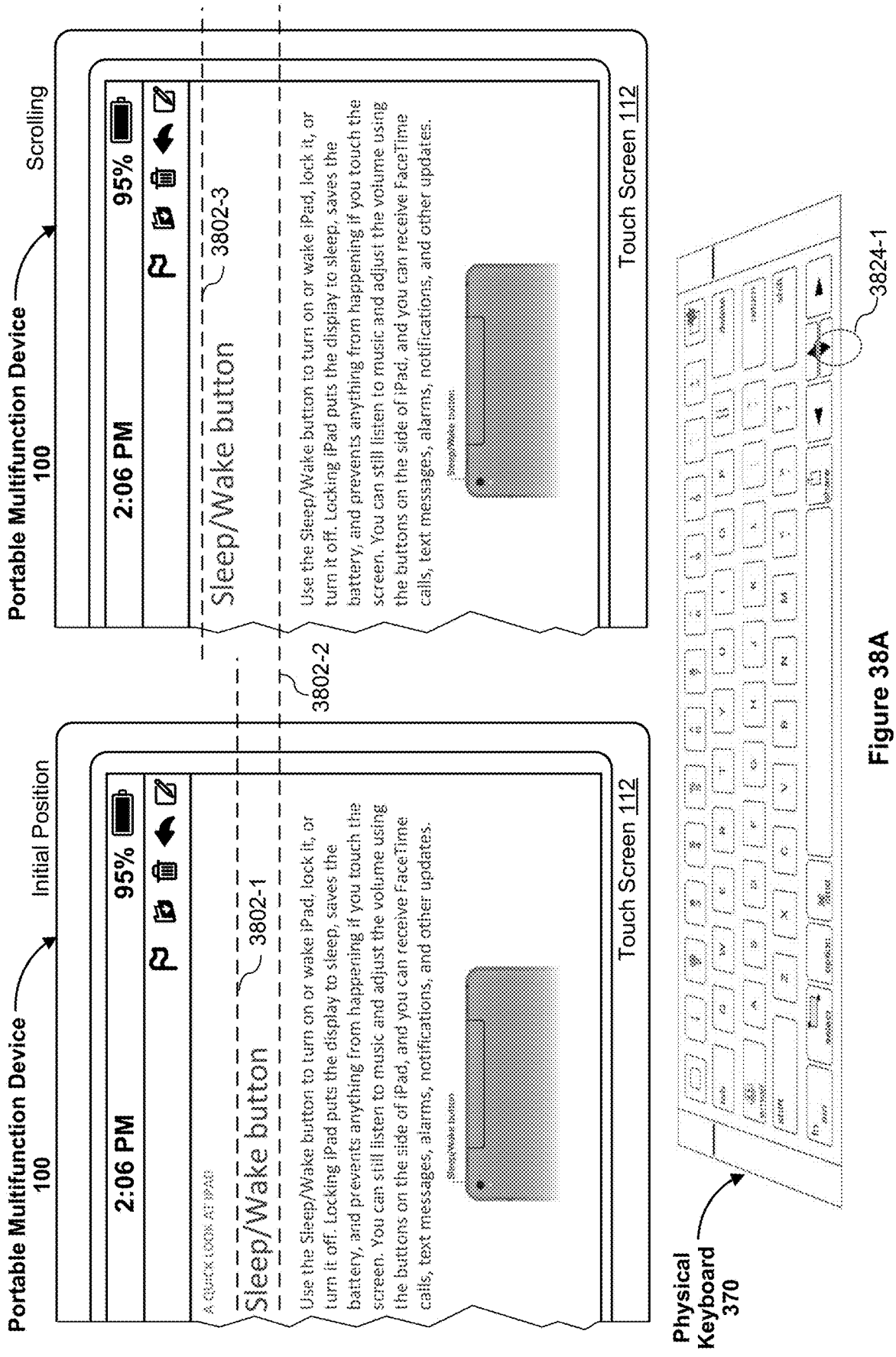

Portable Multifunction Device
100
Initial Position
2:06 PM
95%
A QUICK LOOK AT IPAD
Sleep/Wake button
3802-1
Use the Sleep/Wake button to turn on or wake iPad, lock it, or turn it off. Locking iPad puts the display to sleep, saves the battery, and prevents anything from happening if you touch the screen. You can still listen to music and adjust the volume using the buttons on the side of iPad, and you can receive FaceTime calls, text messages, alarms, notifications, and other updates.
Sleep/Wake button
Touch Screen 112
3802-2
Portable Multifunction Device
100
Scrolling
2:06 PM
95%
Sleep/Wake button
3802-3
Use the Sleep/Wake button to turn on or wake iPad, lock it, or turn it off. Locking iPad puts the display to sleep, saves the battery, and prevents anything from happening if you touch the screen. You can still listen to music and adjust the volume using the buttons on the side of iPad, and you can receive FaceTime calls, text messages, alarms, notifications, and other updates.
Sleep/Wake button
Touch Screen 112
Physical Keyboard
370
3824-1

Figure 38A

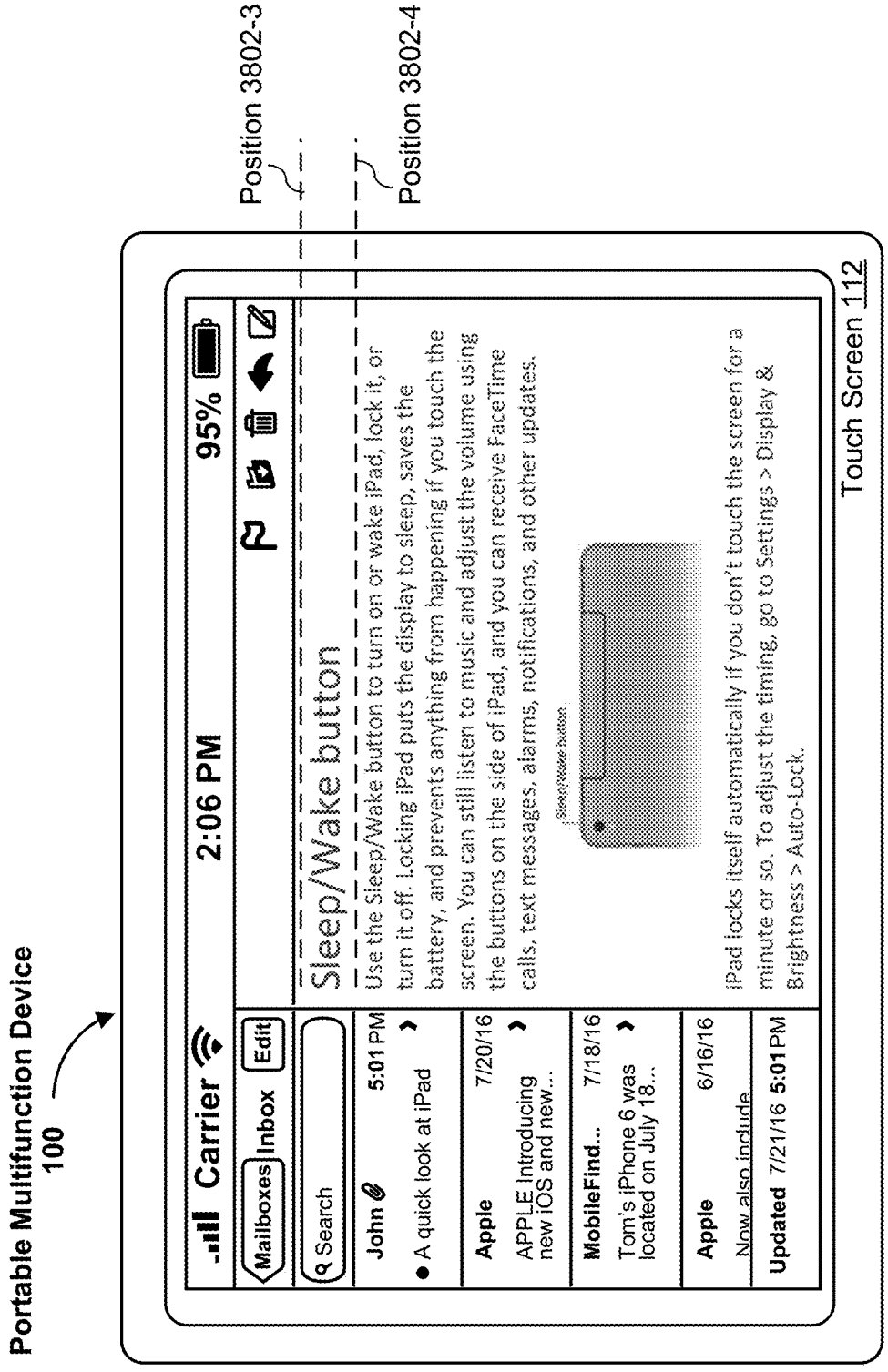

Portable Multifunction Device
100
Carrier
2:06 PM
95%
Mailboxes
Inbox
Edit
Search
John
5:01 PM
A quick look at iPad
Apple
7/20/16
APPLE Introducing new iOS and new...
MobileFind...
7/18/16
Tom's iPhone 6 was located on July 18...
Apple
6/16/16
Now also include
Updated 7/21/16 5:01 PM
Sleep/Wake button
Use the Sleep/Wake button to turn on or wake iPad, lock it, or turn it off. Locking iPad puts the display to sleep, saves the battery, and prevents anything from happening if you touch the screen. You can still listen to music and adjust the volume using the buttons on the side of iPad, and you can receive FaceTime calls, text messages, alarms, notifications, and other updates.
iPad locks itself automatically if you don't touch the screen for a minute or so. To adjust the timing, go to Settings > Display & Brightness > Auto-Lock.
Position 3802-3
Position 3802-4
Touch Screen 112

Figure 38B

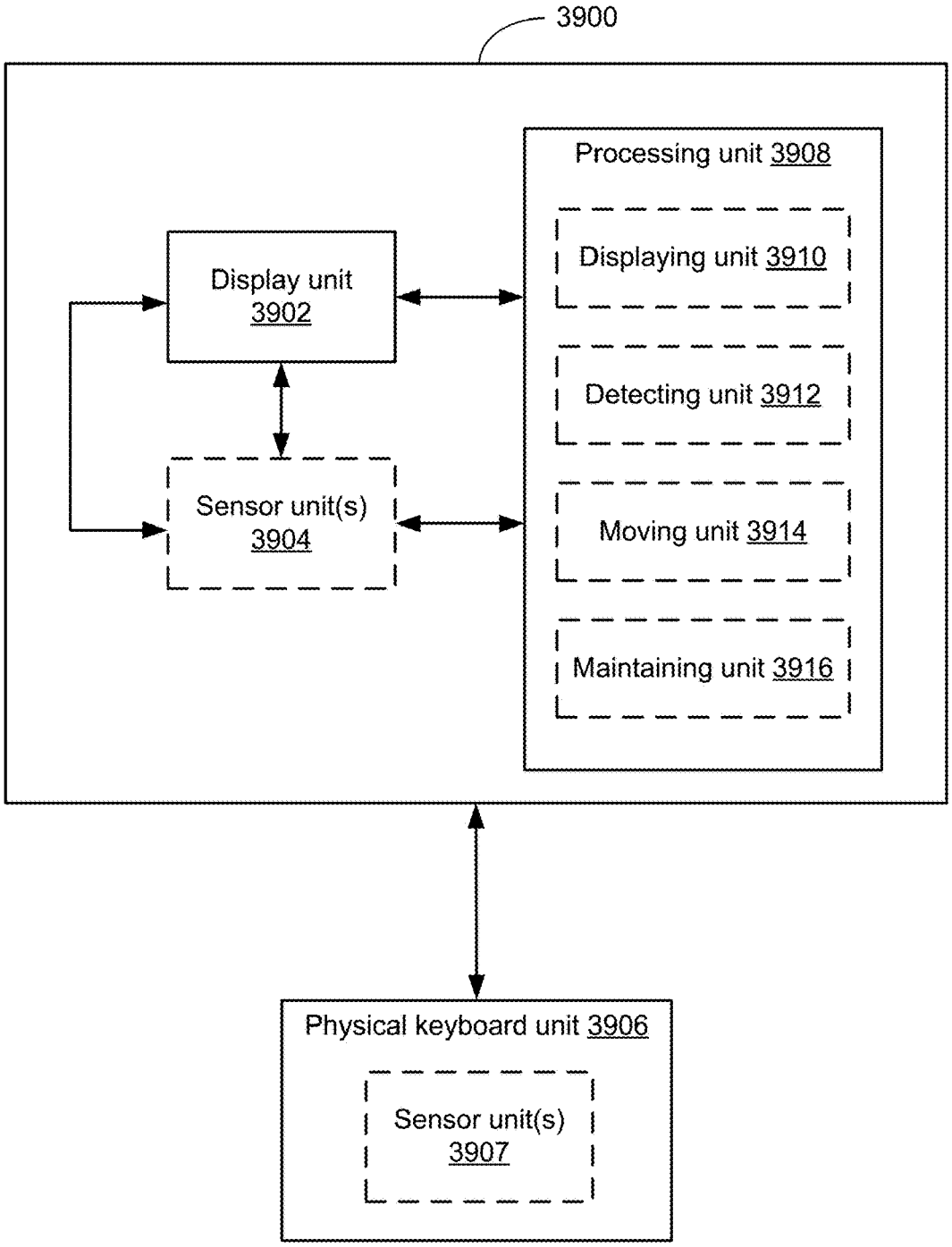

3900
Processing unit 3908
Displaying unit 3910
Detecting unit 3912
Moving unit 3914
Maintaining unit 3916
Display unit 3902
Sensor unit(s) 3904
Physical keyboard unit 3906
Sensor unit(s) 3907

Figure 39

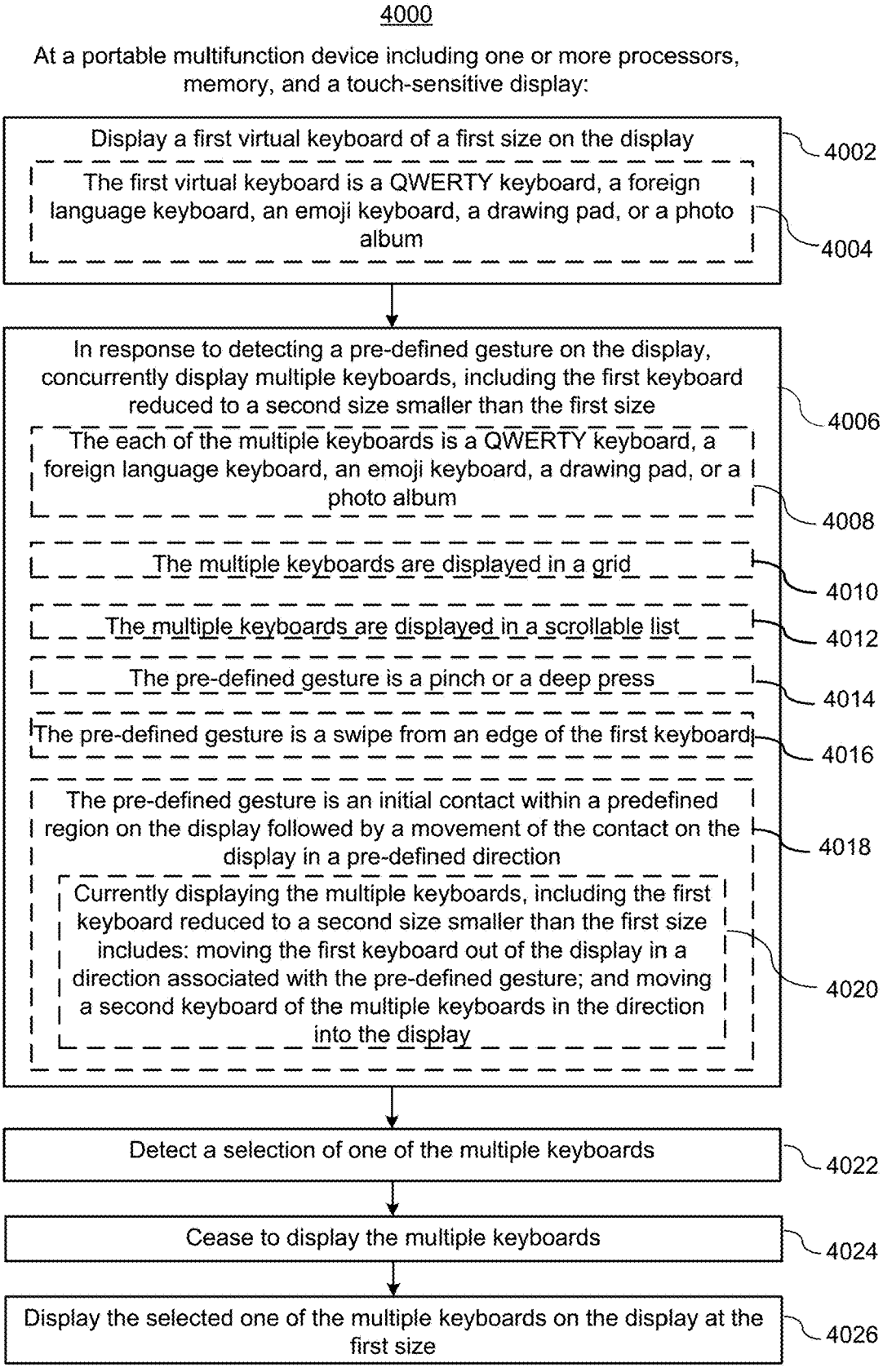

4000
At a portable multifunction device including one or more processors, memory, and a touch-sensitive display:
Display a first virtual keyboard of a first size on the display
4002
The first virtual keyboard is a QWERTY keyboard, a foreign language keyboard, an emoji keyboard, a drawing pad, or a photo album
4004
In response to detecting a pre-defined gesture on the display, concurrently display multiple keyboards, including the first keyboard reduced to a second size smaller than the first size
4006
The each of the multiple keyboards is a QWERTY keyboard, a foreign language keyboard, an emoji keyboard, a drawing pad, or a photo album
4008
The multiple keyboards are displayed in a grid
4010
The multiple keyboards are displayed in a scrollable list
4012
The pre-defined gesture is a pinch or a deep press
4014
The pre-defined gesture is a swipe from an edge of the first keyboard
4016
The pre-defined gesture is an initial contact within a predefined region on the display followed by a movement of the contact on the display in a pre-defined direction
4018
Currently displaying the multiple keyboards, including the first keyboard reduced to a second size smaller than the first size includes: moving the first keyboard out of the display in a direction associated with the pre-defined gesture; and moving a second keyboard of the multiple keyboards in the direction into the display
4020
Detect a selection of one of the multiple keyboards
4022
Cease to display the multiple keyboards
4024
Display the selected one of the multiple keyboards on the display at the first size
4026

Figure 40

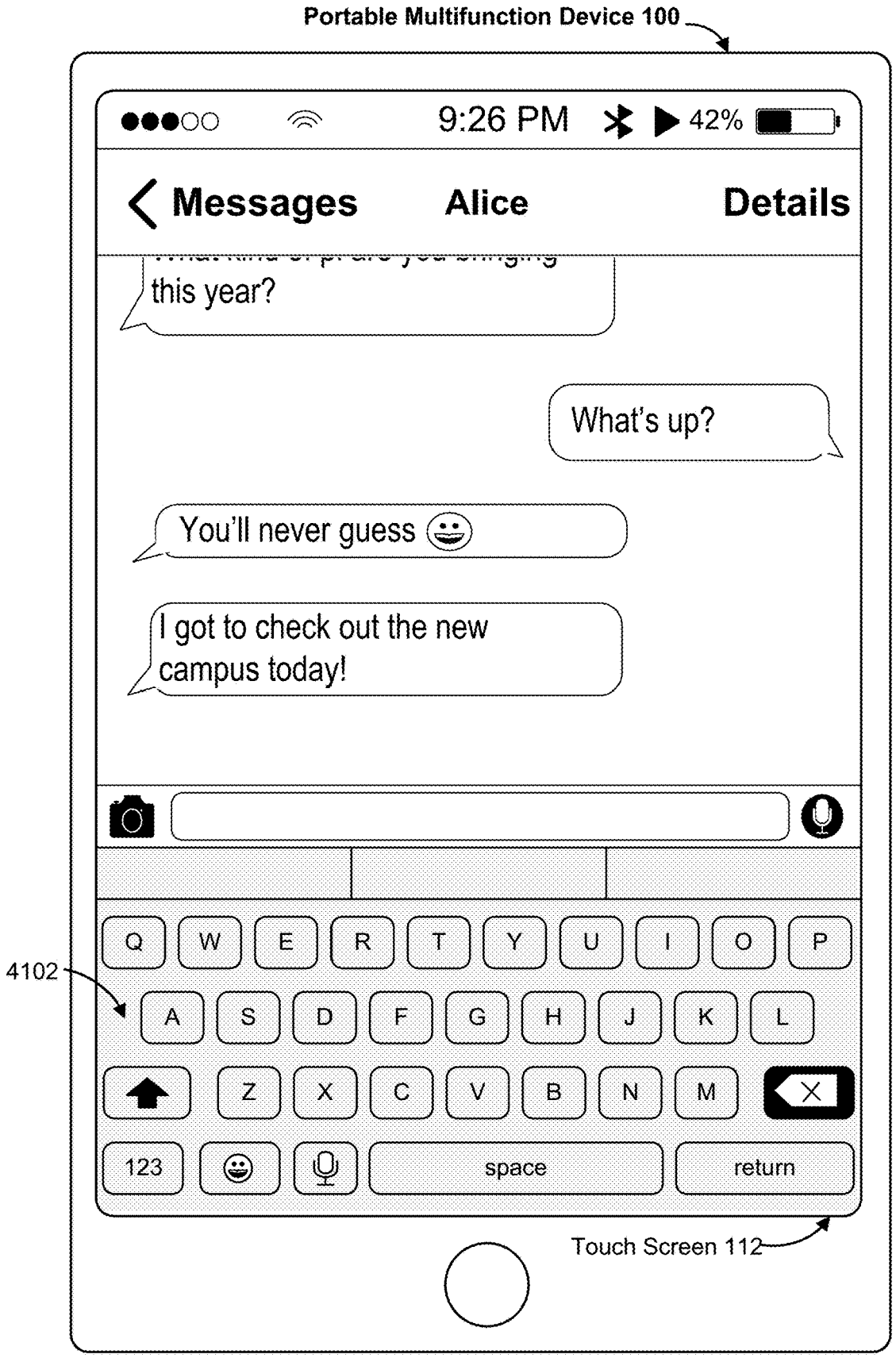

Portable Multifunction Device 100
9:26 PM
42%
Messages
Alice
Details
this year?
What's up?
You'll never guess
I got to check out the new campus today!
4102
Q W E R T Y U I O P
A S D F G H J K L
Z X C V B N M
123
space
return
Touch Screen 112

Figure 41A

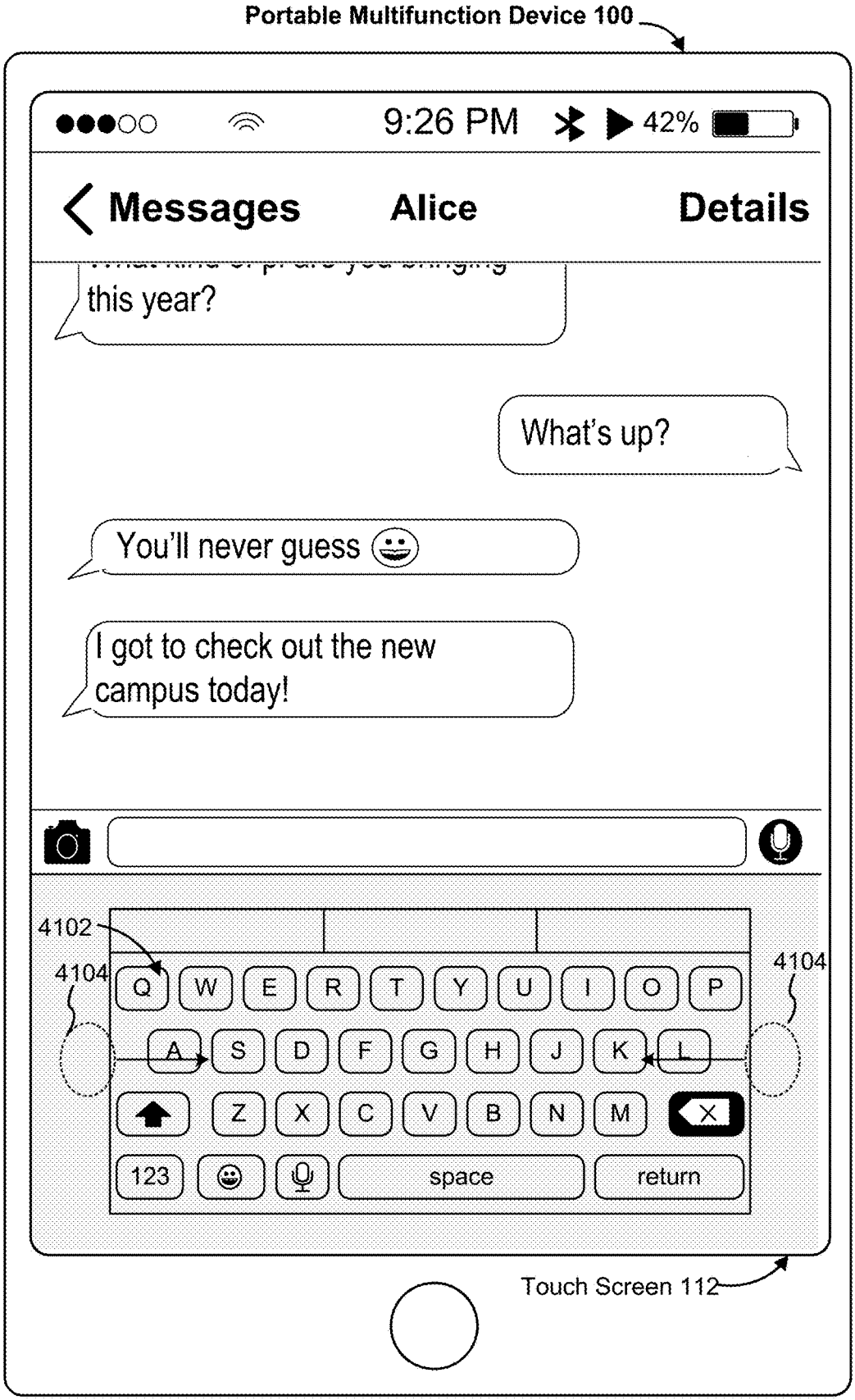

Portable Multifunction Device 100
9:26 PM
42%
Messages
Alice
Details
this year?
What's up?
You'll never guess
I got to check out the new campus today!
4102
4104
4104
Q W E R T Y U I O P
A S D F G H J K L
Z X C V B N M
123
space
return
Touch Screen 112

Figure 41B

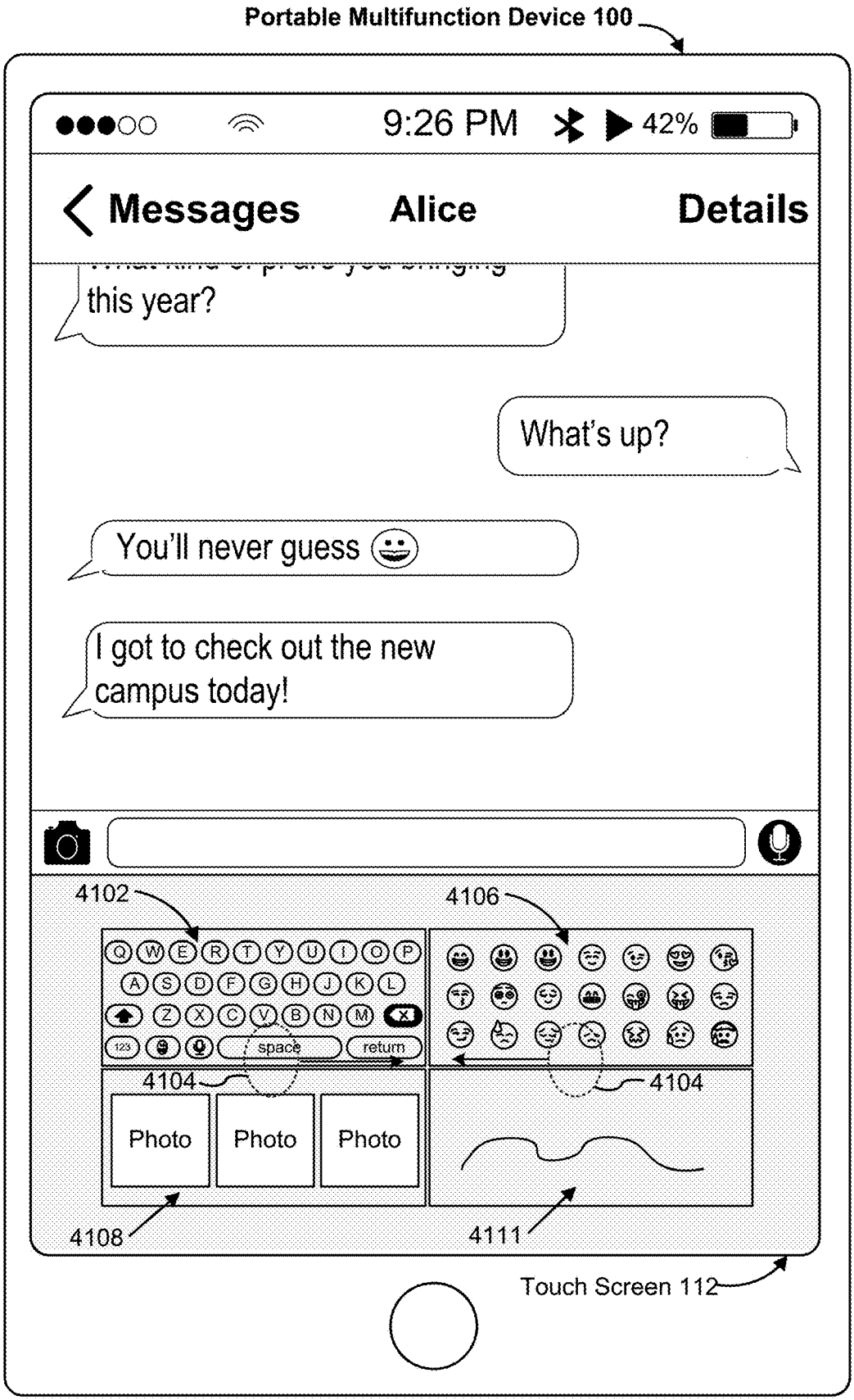

Portable Multifunction Device 100
9:26 PM
42%
Messages
Alice
Details
this year?
What's up?
You'll never guess
I got to check out the new campus today!
4102
4106
space
return
4104
4104
Photo
Photo
Photo
4108
4111
Touch Screen 112

Figure 41C

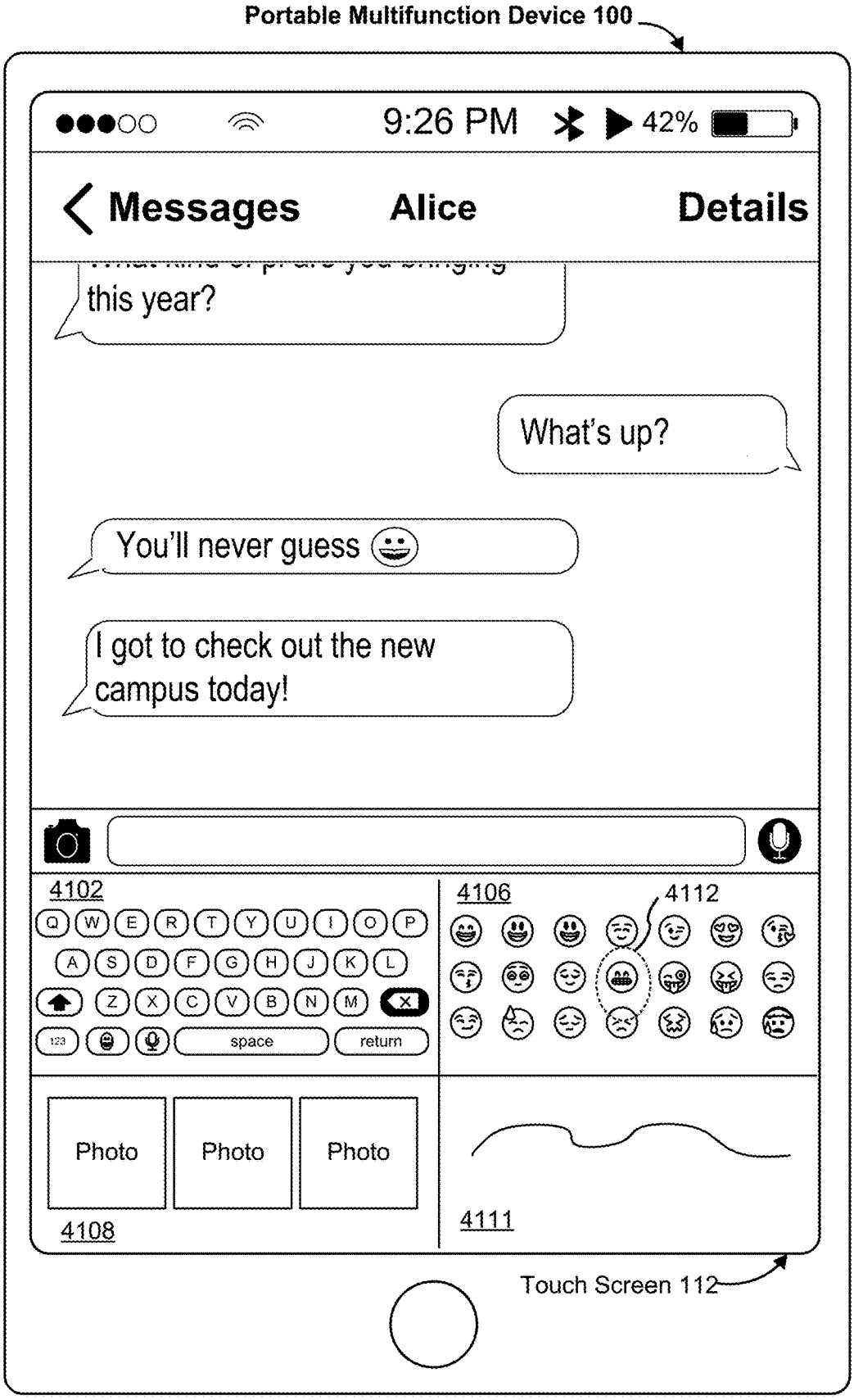

Portable Multifunction Device 100
9:26 PM
42%
Messages
Alice
Details
this year?
What's up?
You'll never guess
I got to check out the new campus today!
4102
4106
4112
space
return
Photo
Photo
Photo
4108
4111
Touch Screen 112

Figure 41D

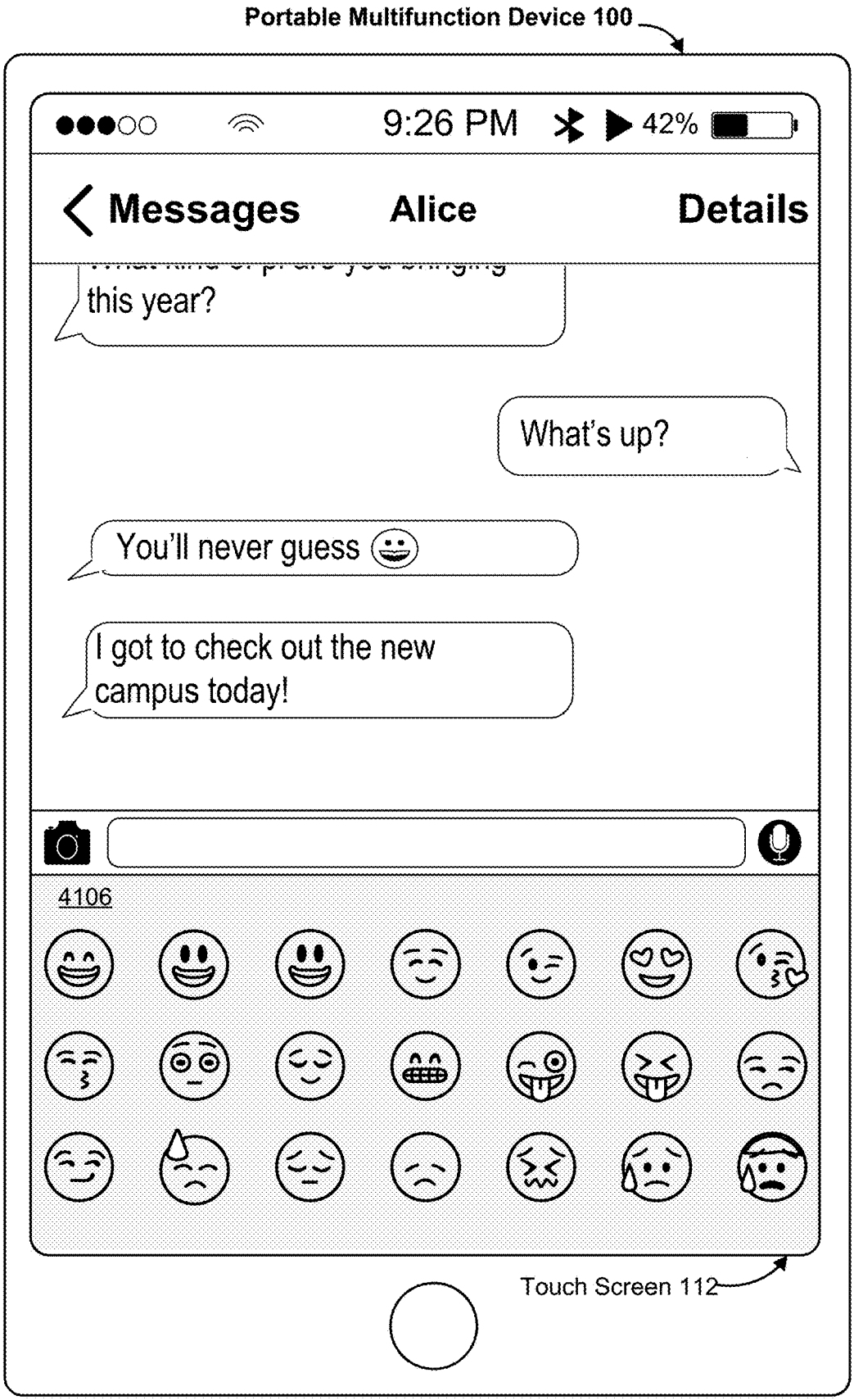

Portable Multifunction Device 100
9:26 PM
42%
Messages
Alice
Details
this year?
What's up?
You'll never guess
I got to check out the new campus today!
4106
Touch Screen 112

Figure 41E

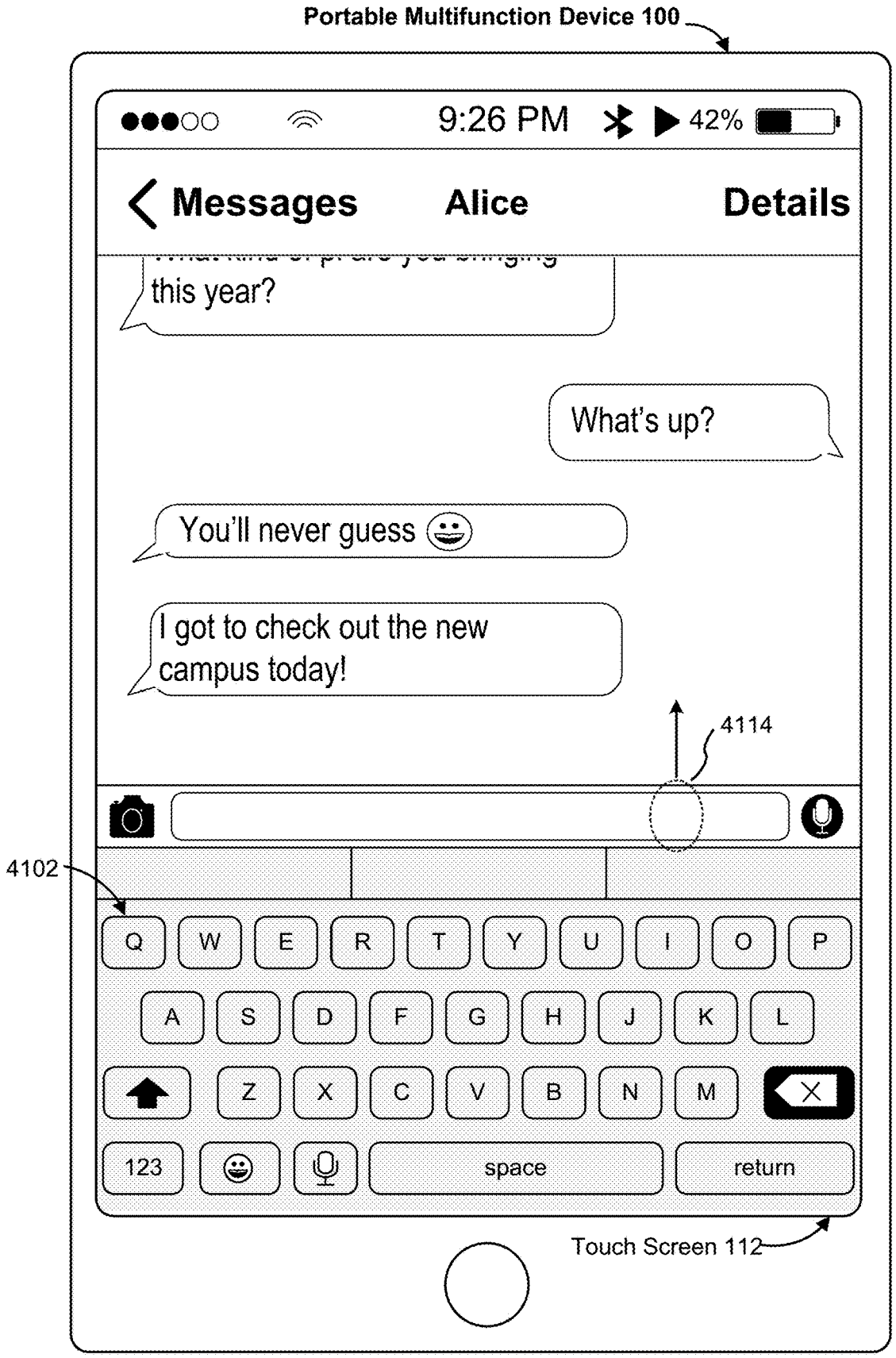

Portable Multifunction Device 100
9:26 PM
42%
Messages
Alice
Details
this year?
What's up?
You'll never guess
I got to check out the new campus today!
4114
4102
Q W E R T Y U I O P
A S D F G H J K L
Z X C V B N M
123
space
return
Touch Screen 112

Figure 41F

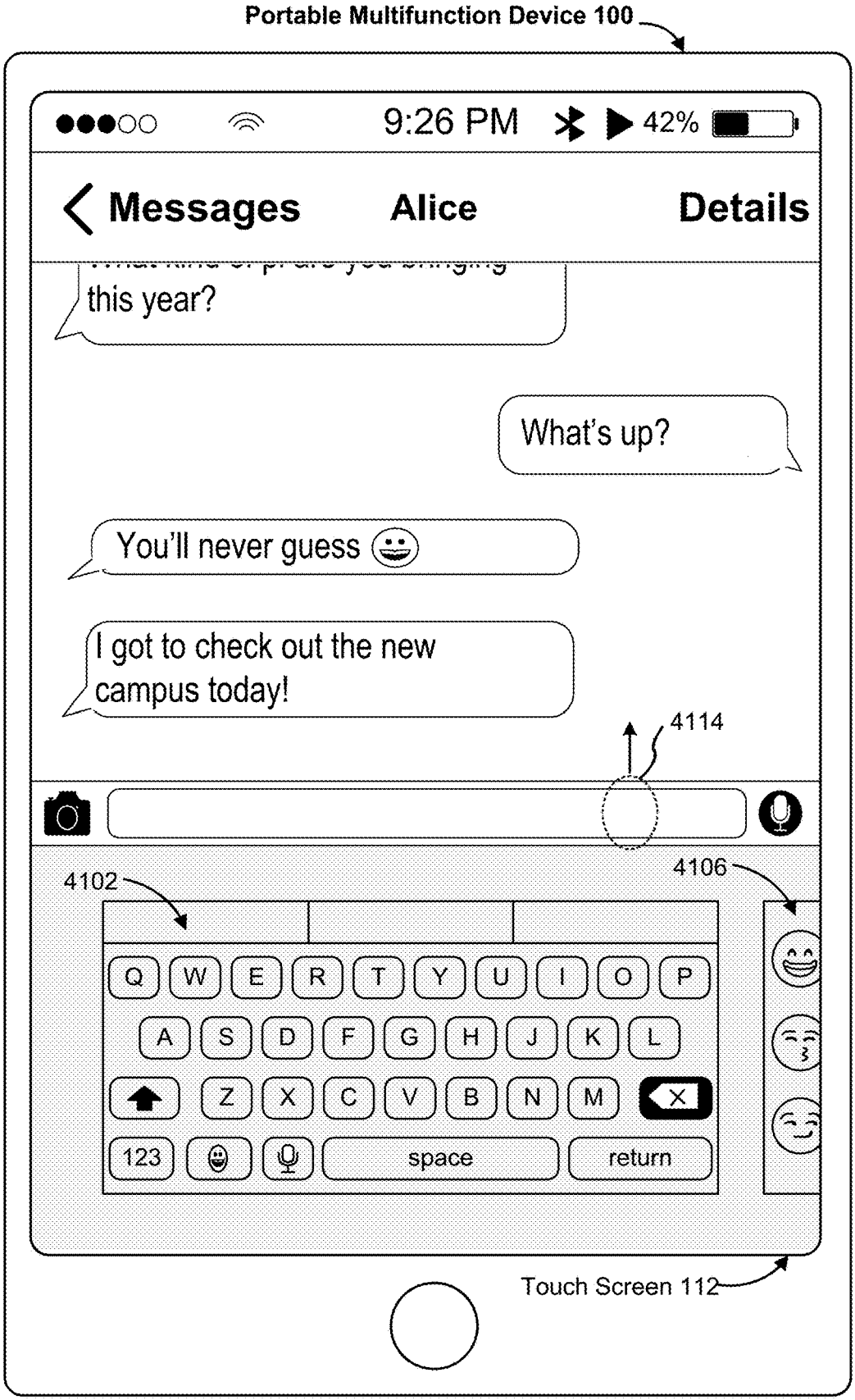

Portable Multifunction Device 100
9:26 PM
42%
Messages
Alice
Details
this year?
What's up?
You'll never guess
I got to check out the new campus today!
4114
4102
4106
Q W E R T Y U I O P
A S D F G H J K L
Z X C V B N M
123
space
return
Touch Screen 112

Figure 41G

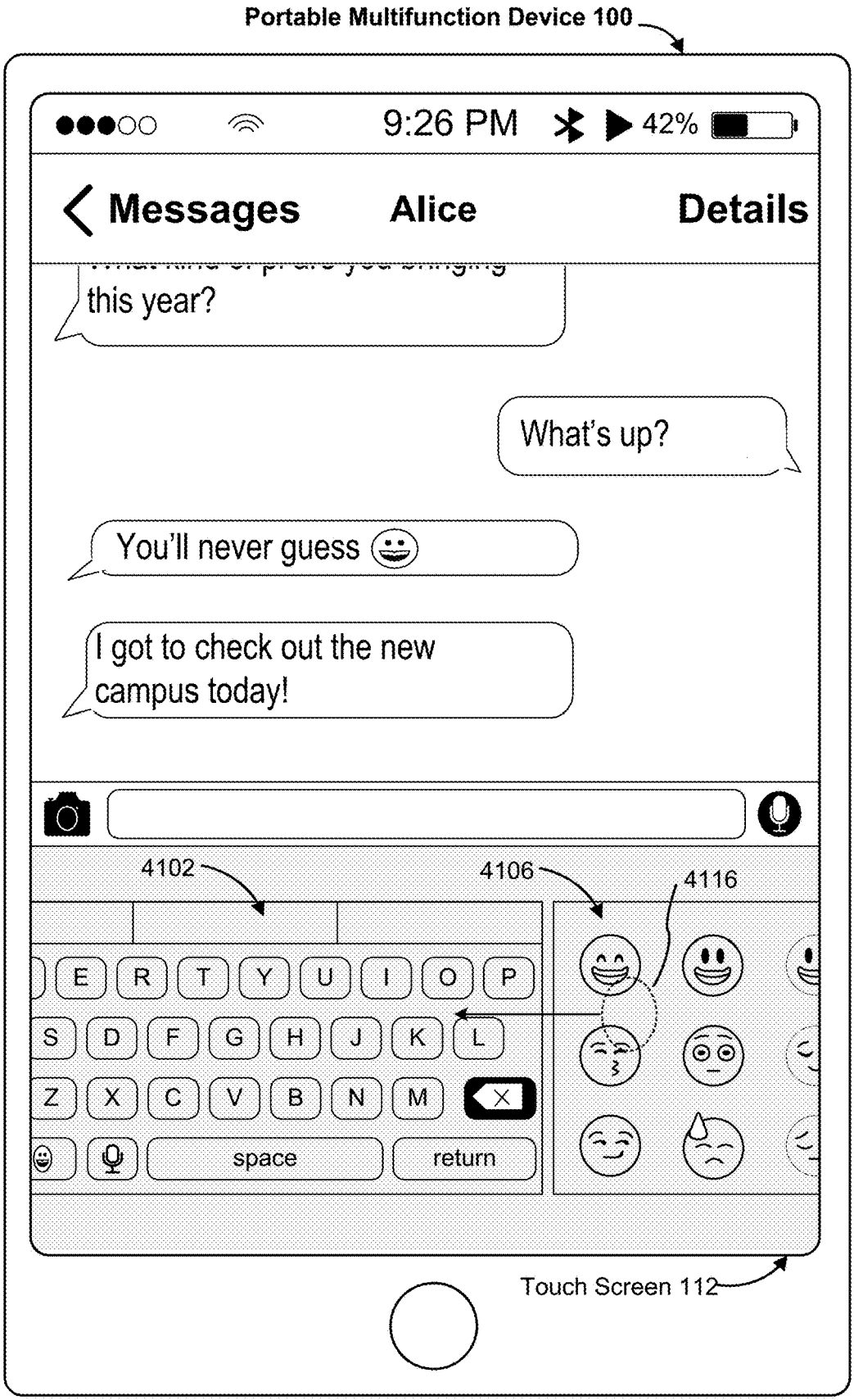

Portable Multifunction Device 100
9:26 PM
42%
Messages
Alice
Details
this year?
What's up?
You'll never guess
I got to check out the new campus today!
4102
4106
4116
E R T Y U I O P
S D F G H J K L
Z X C V B N M
space
return
Touch Screen 112

Figure 41H

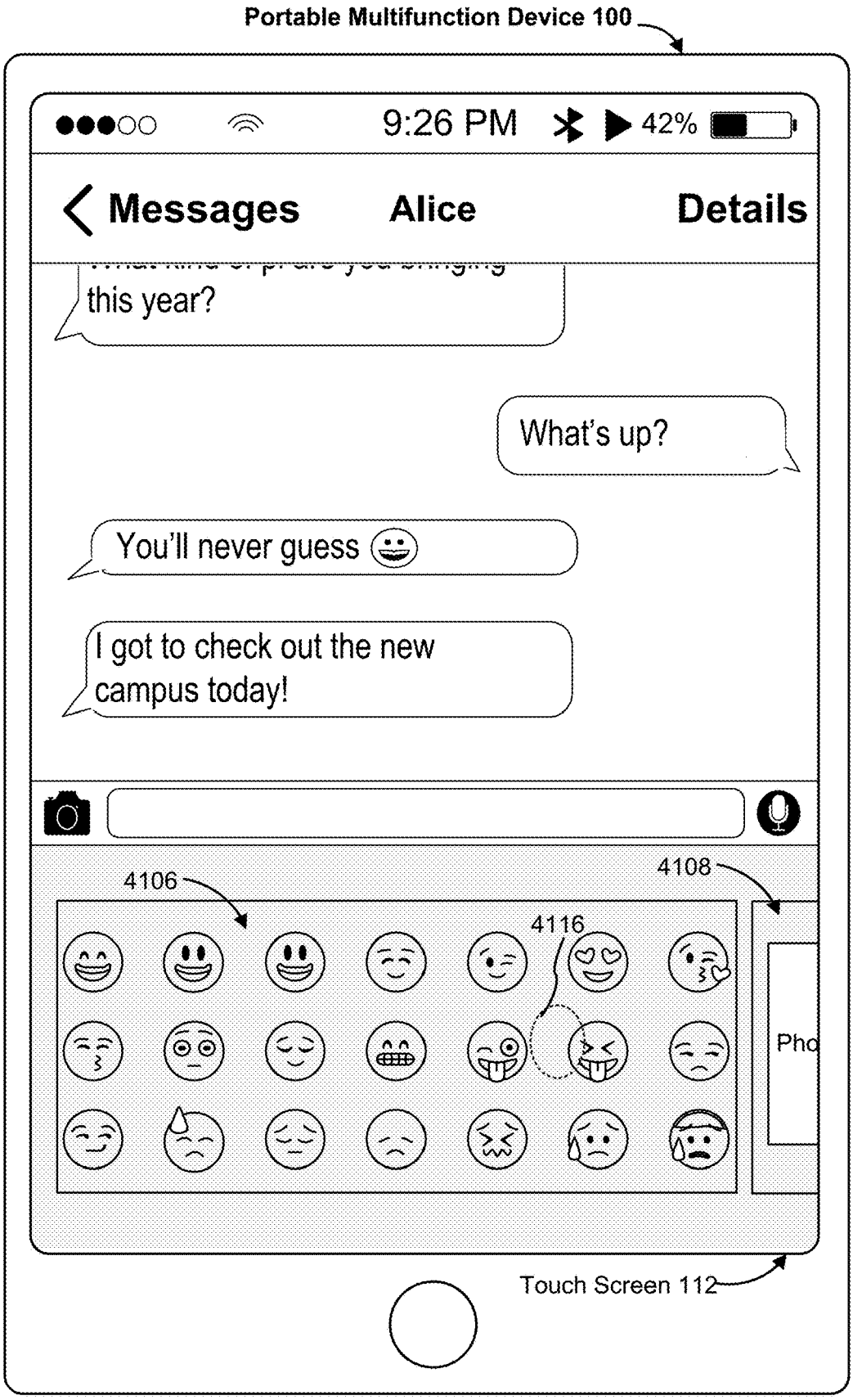

Portable Multifunction Device 100
9:26 PM
42%
Messages
Alice
Details
this year?
What's up?
You'll never guess
I got to check out the new campus today!
4106
4108
4116
Pho
Touch Screen 112

Figure 41I

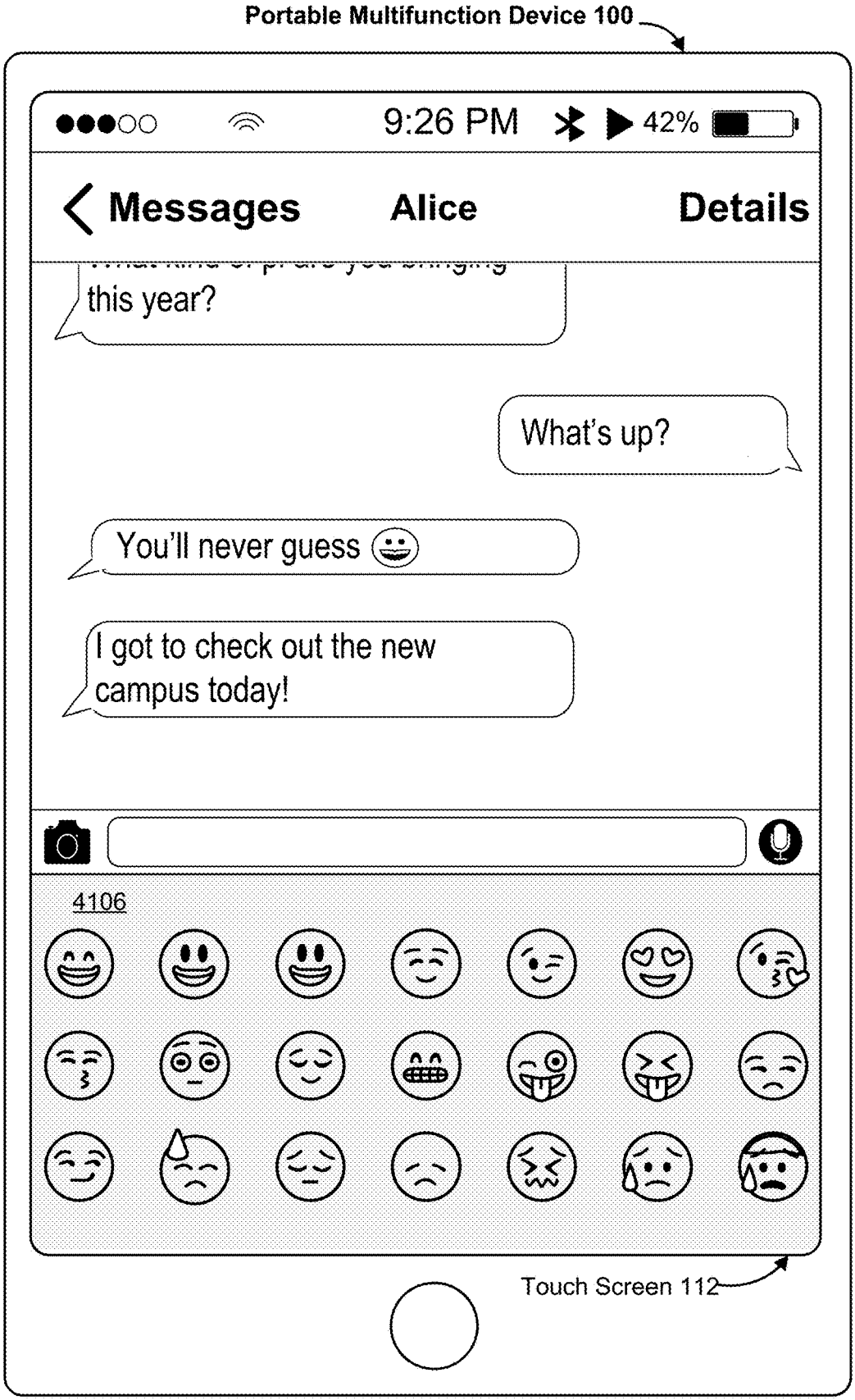

Portable Multifunction Device 100
9:26 PM
42%
Messages
Alice
Details
this year?
What's up?
You'll never guess
I got to check out the new campus today!
4106
Touch Screen 112

Figure 41J

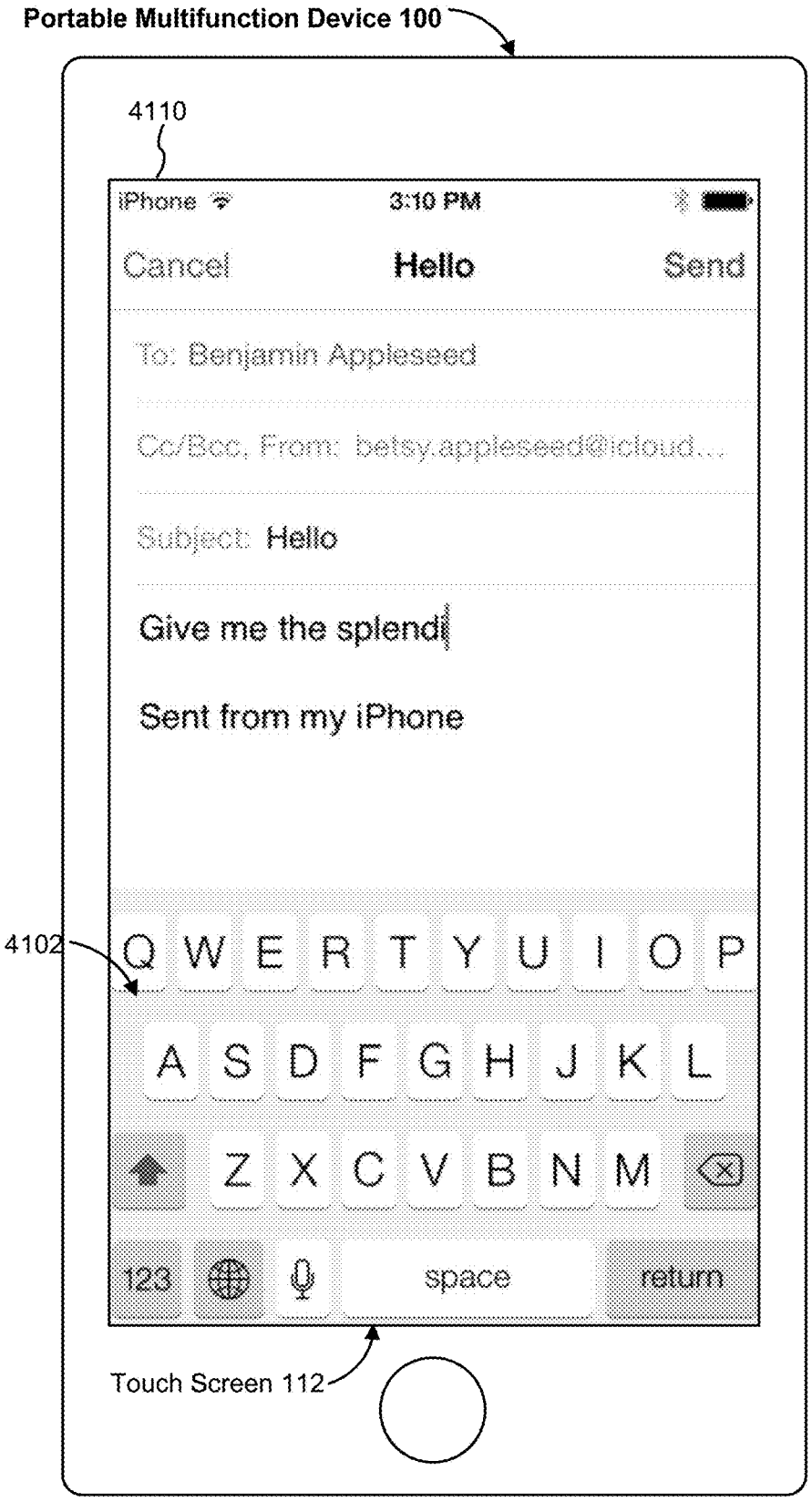

Portable Multifunction Device 100
4110
iPhone
3:10 PM
Cancel
Hello
Send
To: Benjamin Appleseed
Cc/Bcc, From: betsy.appleseed@icloud...
Subject: Hello
Give me the splendi
Sent from my iPhone
4102
Q W E R T Y U I O P
A S D F G H J K L
Z X C V B N M
123
space
return
Touch Screen 112

Figure 41K

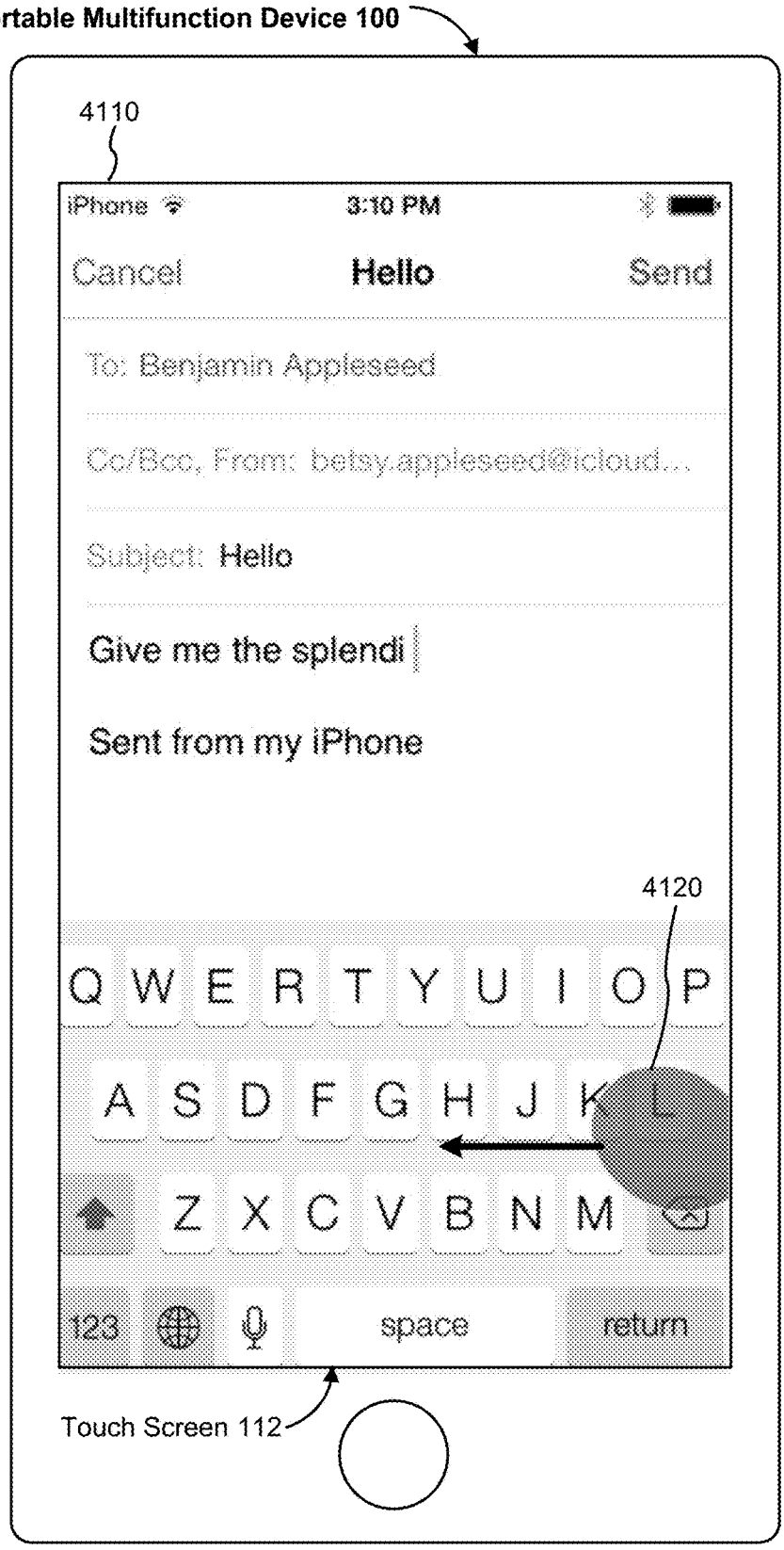

Portable Multifunction Device 100
4110
iPhone
3:10 PM
Cancel
Hello
Send
To: Benjamin Appleseed
Cc/Bcc, From: betsy.appleseed@icloud...
Subject: Hello
Give me the splendi
Sent from my iPhone
4120
Q W E R T Y U I O P
A S D F G H J K L
Z X C V B N M
123
space
return
Touch Screen 112

Figure 41L

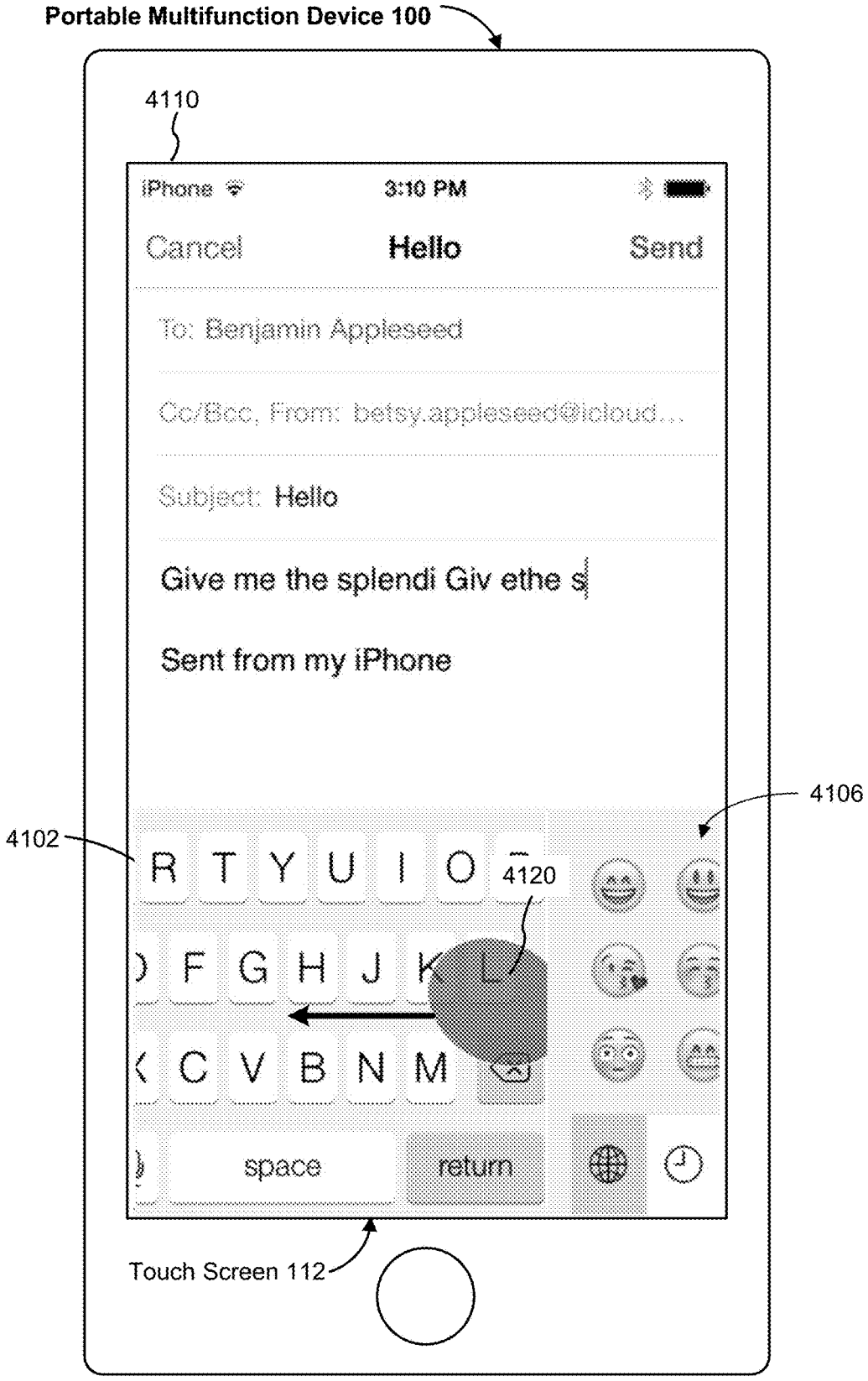

Portable Multifunction Device 100
4110
iPhone
3:10 PM
Cancel
Hello
Send
To: Benjamin Appleseed
Cc/Bcc, From: betsy.appleseed@icloud...
Subject: Hello
Give me the splendi Giv ethe s
Sent from my iPhone
4102
4106
4120
space
return
Touch Screen 112

Figure 41M

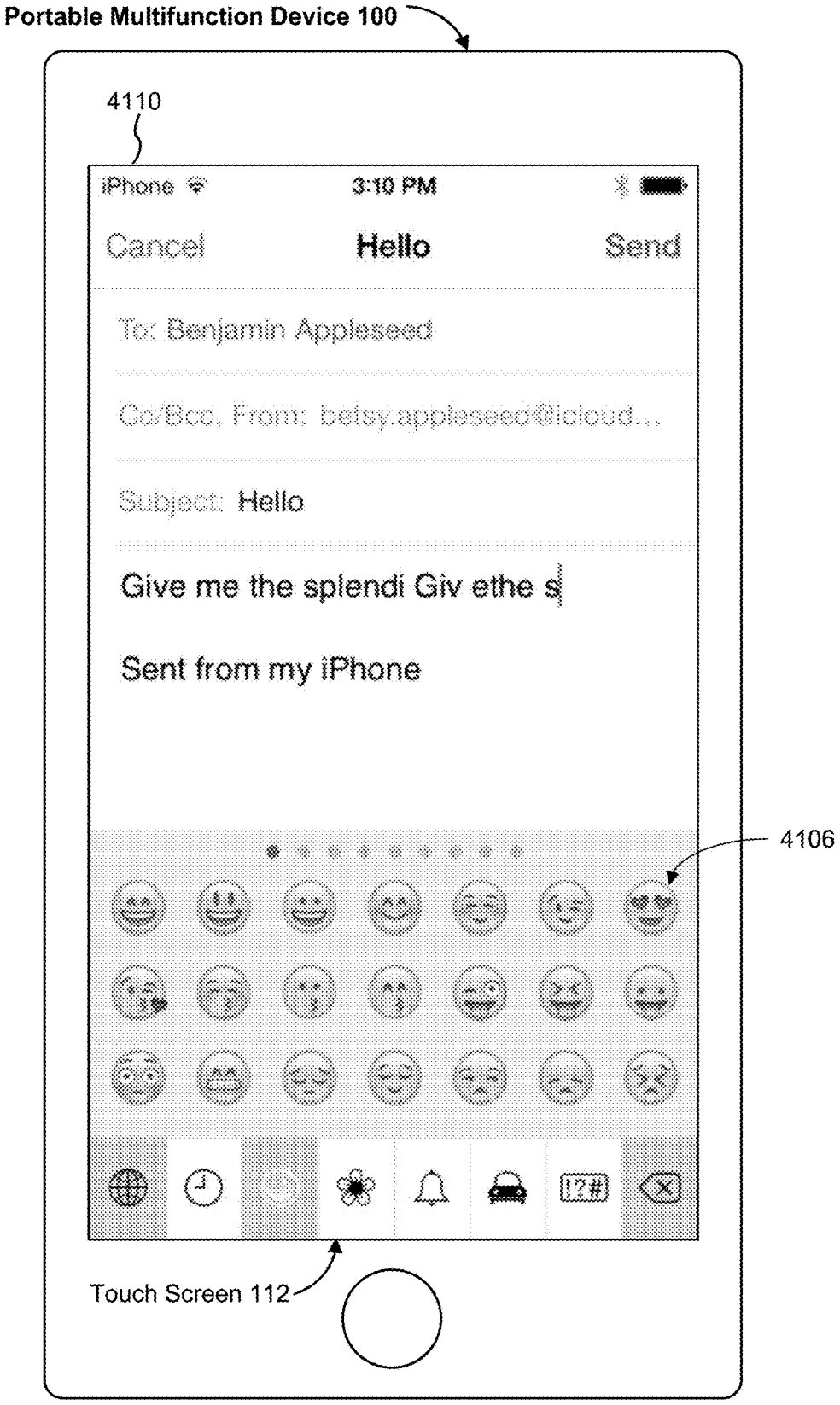

Portable Multifunction Device 100
4110
iPhone
3:10 PM
Cancel
Hello
Send
To: Benjamin Appleseed
Cc/Bcc, From: betsy.appleseed@icloud...
Subject: Hello
Give me the splendi Giv ethe s
Sent from my iPhone
4106
Touch Screen 112

Figure 41N

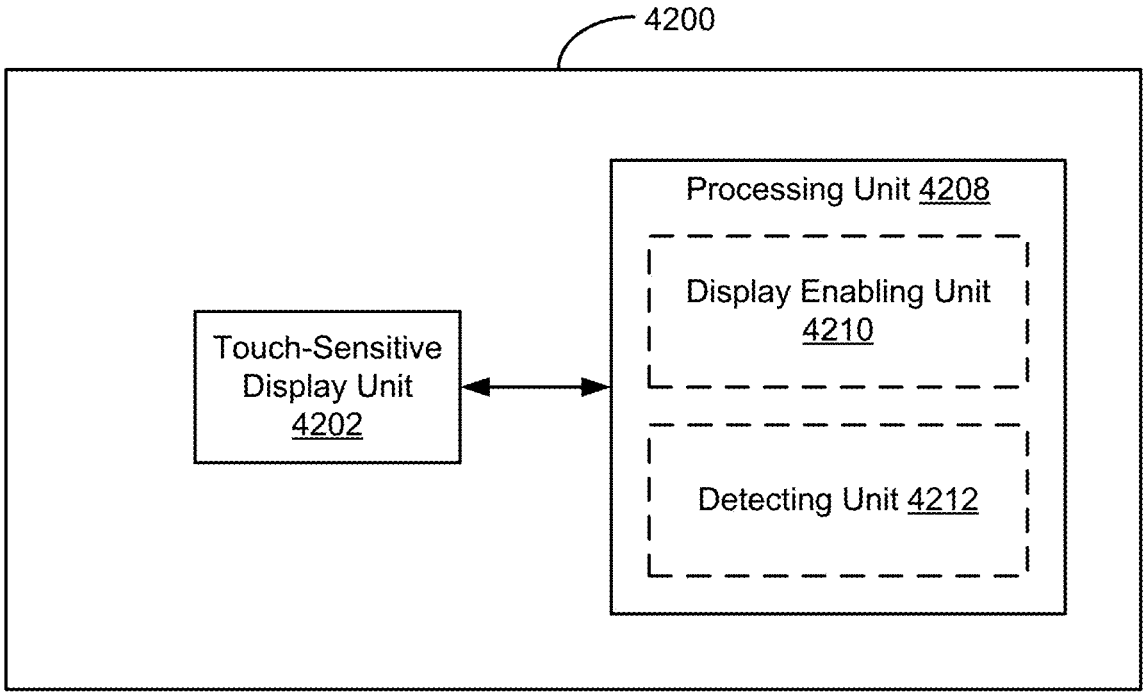

4200
Processing Unit 4208
Display Enabling Unit 4210
Detecting Unit 4212
Touch-Sensitive Display Unit 4202

Figure 42

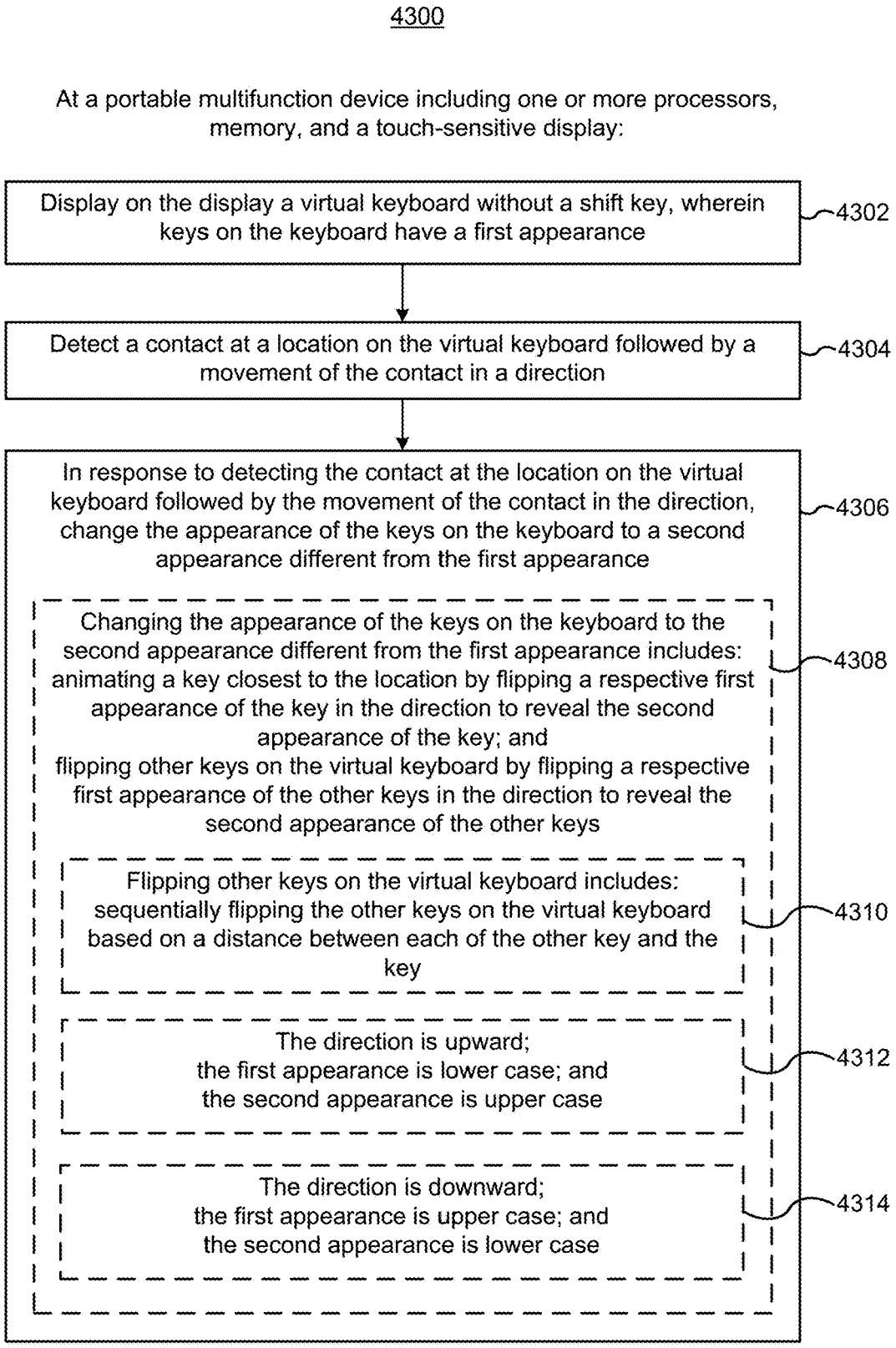

4300
At a portable multifunction device including one or more processors, memory, and a touch-sensitive display:
Display on the display a virtual keyboard without a shift key, wherein keys on the keyboard have a first appearance
4302
Detect a contact at a location on the virtual keyboard followed by a movement of the contact in a direction
4304
In response to detecting the contact at the location on the virtual keyboard followed by the movement of the contact in the direction, change the appearance of the keys on the keyboard to a second appearance different from the first appearance
4306
Changing the appearance of the keys on the keyboard to the second appearance different from the first appearance includes: animating a key closest to the location by flipping a respective first appearance of the key in the direction to reveal the second appearance of the key; and flipping other keys on the virtual keyboard by flipping a respective first appearance of the other keys in the direction to reveal the second appearance of the other keys
4308
Flipping other keys on the virtual keyboard includes: sequentially flipping the other keys on the virtual keyboard based on a distance between each of the other key and the key
4310
The direction is upward; the first appearance is lower case; and the second appearance is upper case
4312
The direction is downward; the first appearance is upper case; and the second appearance is lower case
4314

Figure 43

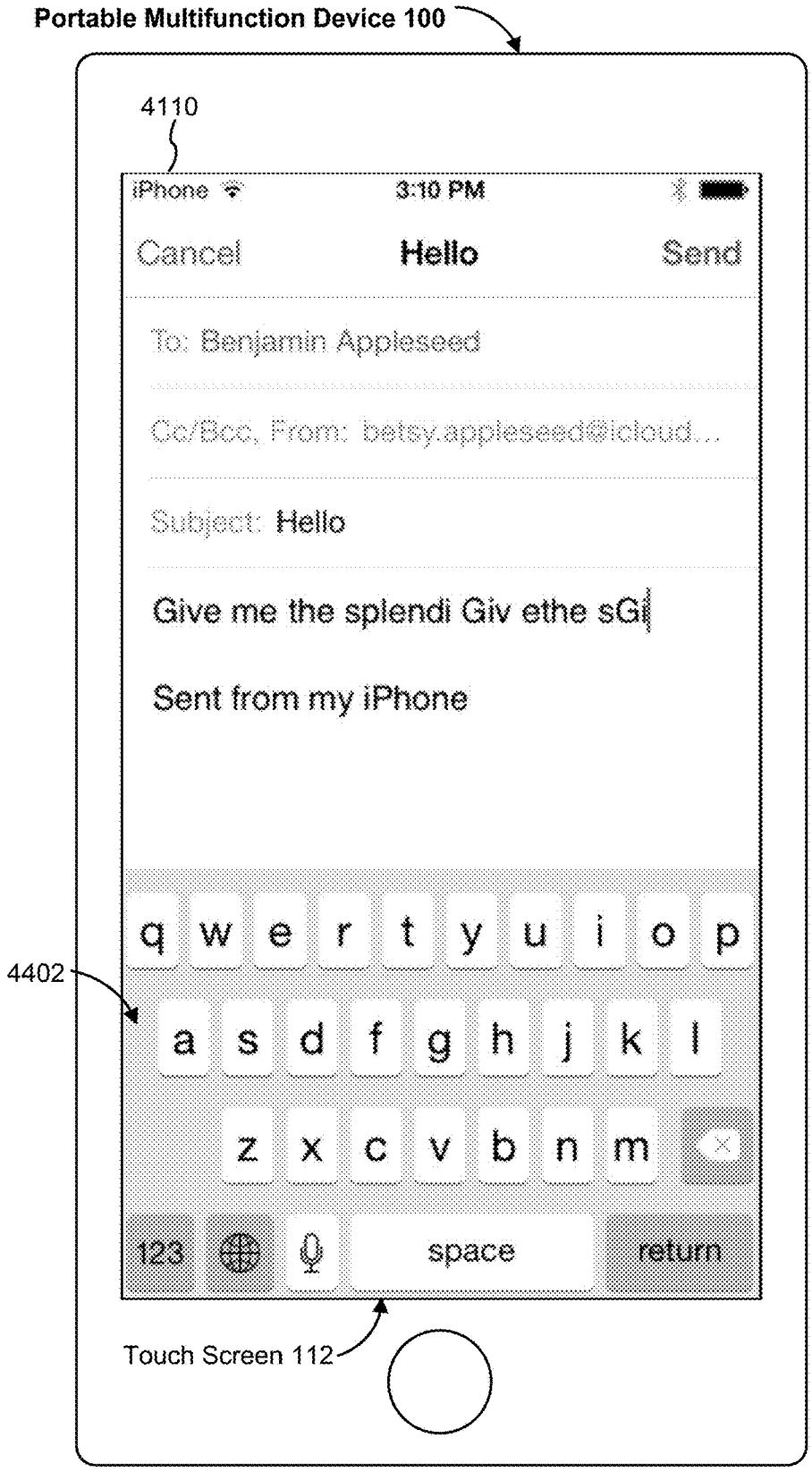

Portable Multifunction Device 100
4110
iPhone
3:10 PM
Cancel
Hello
Send
To: Benjamin Appleseed
Cc/Bcc, From: betsy.appleseed@icloud...
Subject: Hello
Give me the splendi Giv ethe sGi
Sent from my iPhone
4402
q w e r t y u i o p
a s d f g h j k l
z x c v b n m
123
space
return
Touch Screen 112

Figure 44A

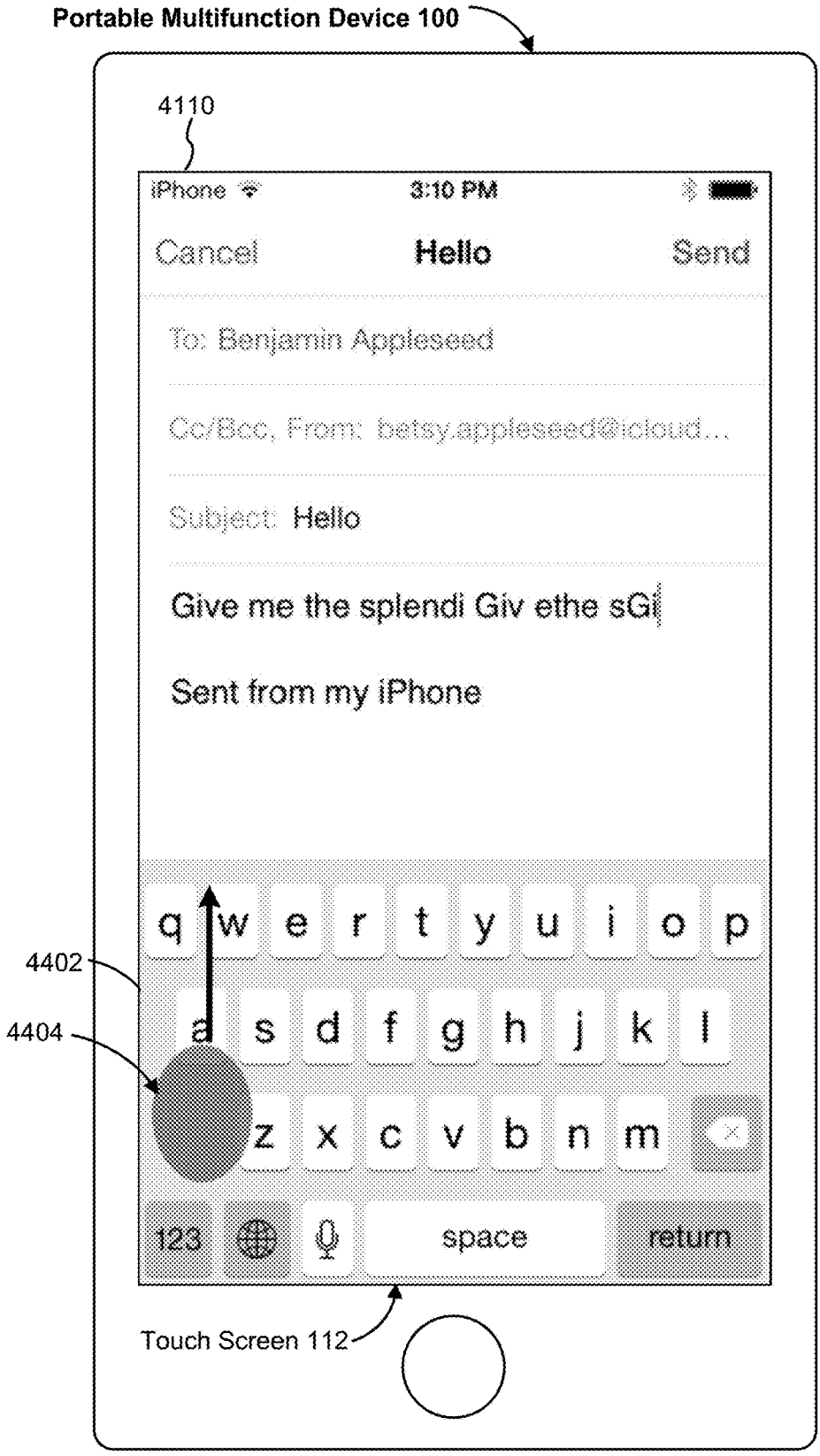

Portable Multifunction Device 100
4110
iPhone
3:10 PM
Cancel
Hello
Send
To: Benjamin Appleseed
Cc/Bcc, From: betsy.appleseed@icloud...
Subject: Hello
Give me the splendi Giv ethe sGi
Sent from my iPhone
4402
4404
q w e r t y u i o p
a s d f g h j k l
z x c v b n m
123
space
return
Touch Screen 112

Figure 44B

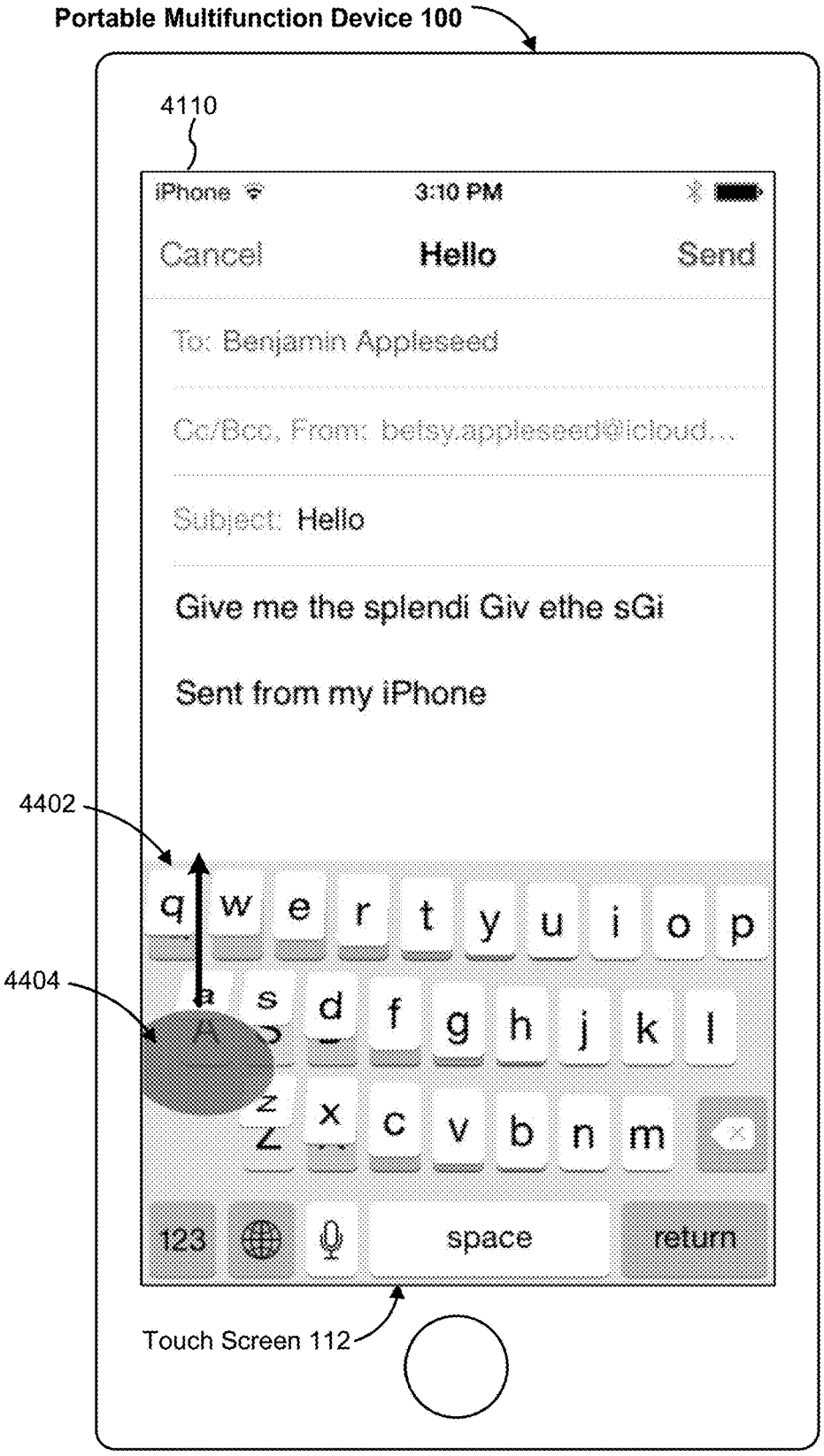

Portable Multifunction Device 100
4110
iPhone
3:10 PM
Cancel
Hello
Send
To: Benjamin Appleseed
Cc/Bcc, From: betsy.appleseed@icloud...
Subject: Hello
Give me the splendi Giv ethe sGi
Sent from my iPhone
4402
4404
q w e r t y u i o p
a s d f g h j k l
z x c v b n m
123
space
return
Touch Screen 112

Figure 44C

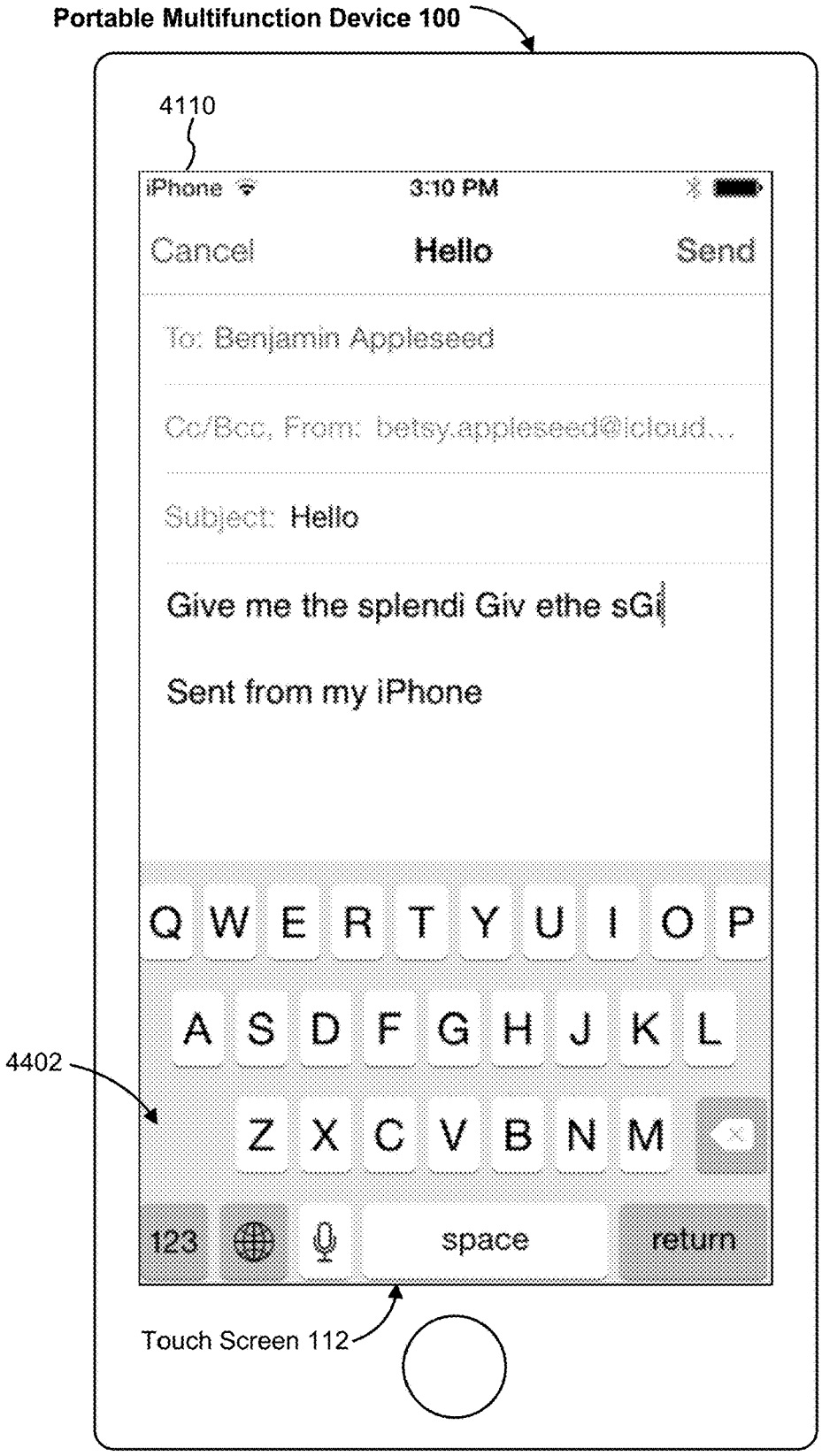

Portable Multifunction Device 100
4110
iPhone
3:10 PM
Cancel
Hello
Send
To: Benjamin Appleseed
Cc/Bcc, From: betsy.appleseed@icloud...
Subject: Hello
Give me the splendi Giv ethe sGi
Sent from my iPhone
Q W E R T Y U I O P
A S D F G H J K L
Z X C V B N M
123
space
return
4402
Touch Screen 112

Figure 44D

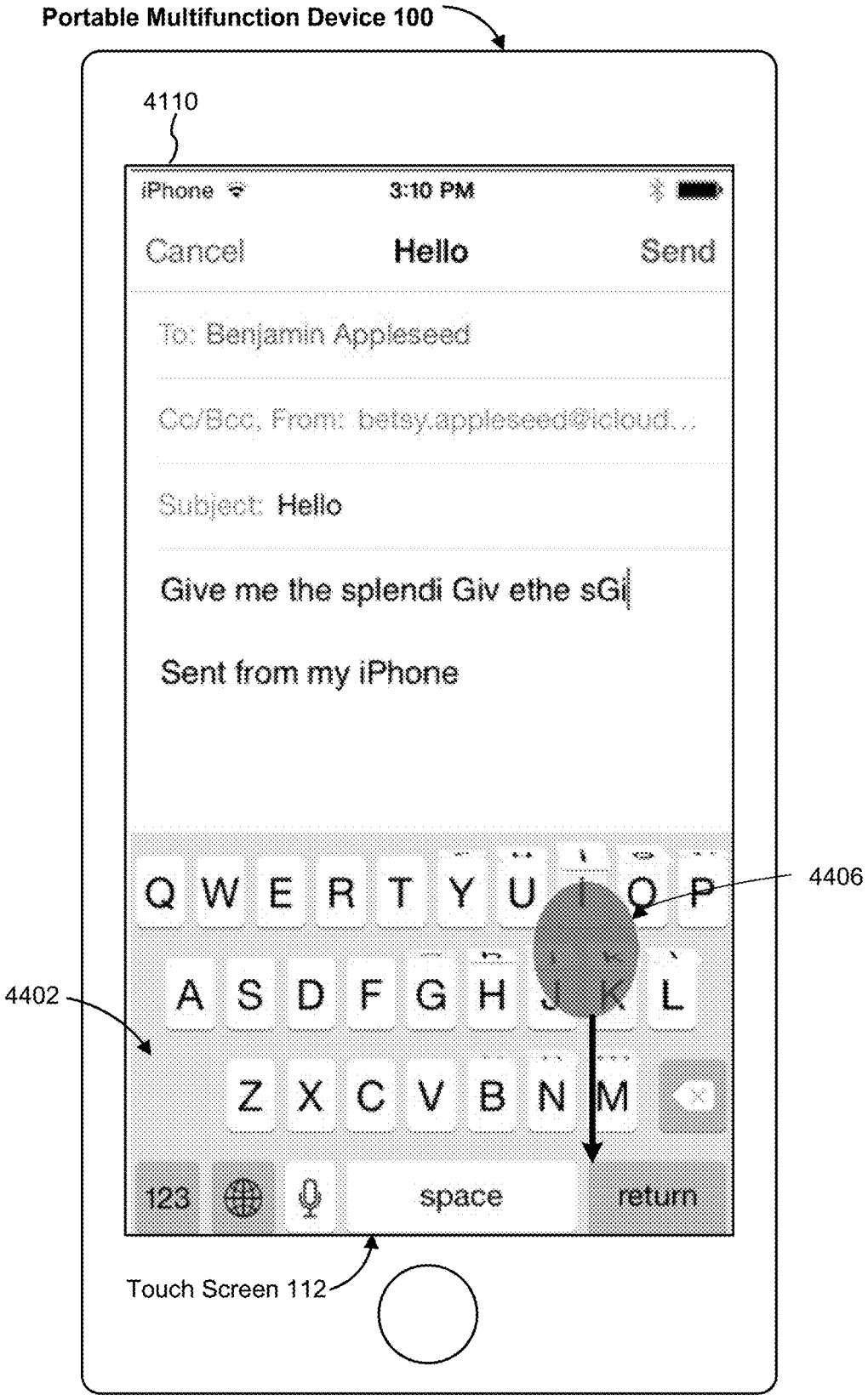

Portable Multifunction Device 100
4110
iPhone
3:10 PM
Cancel
Hello
Send
To: Benjamin Appleseed
Cc/Bcc, From: betsy.appleseed@icloud...
Subject: Hello
Give me the splendi Giv ethe sGi
Sent from my iPhone
4406
4402
Q W E R T Y U I O P
A S D F G H J K L
Z X C V B N M
123
space
return
Touch Screen 112

Figure 44E

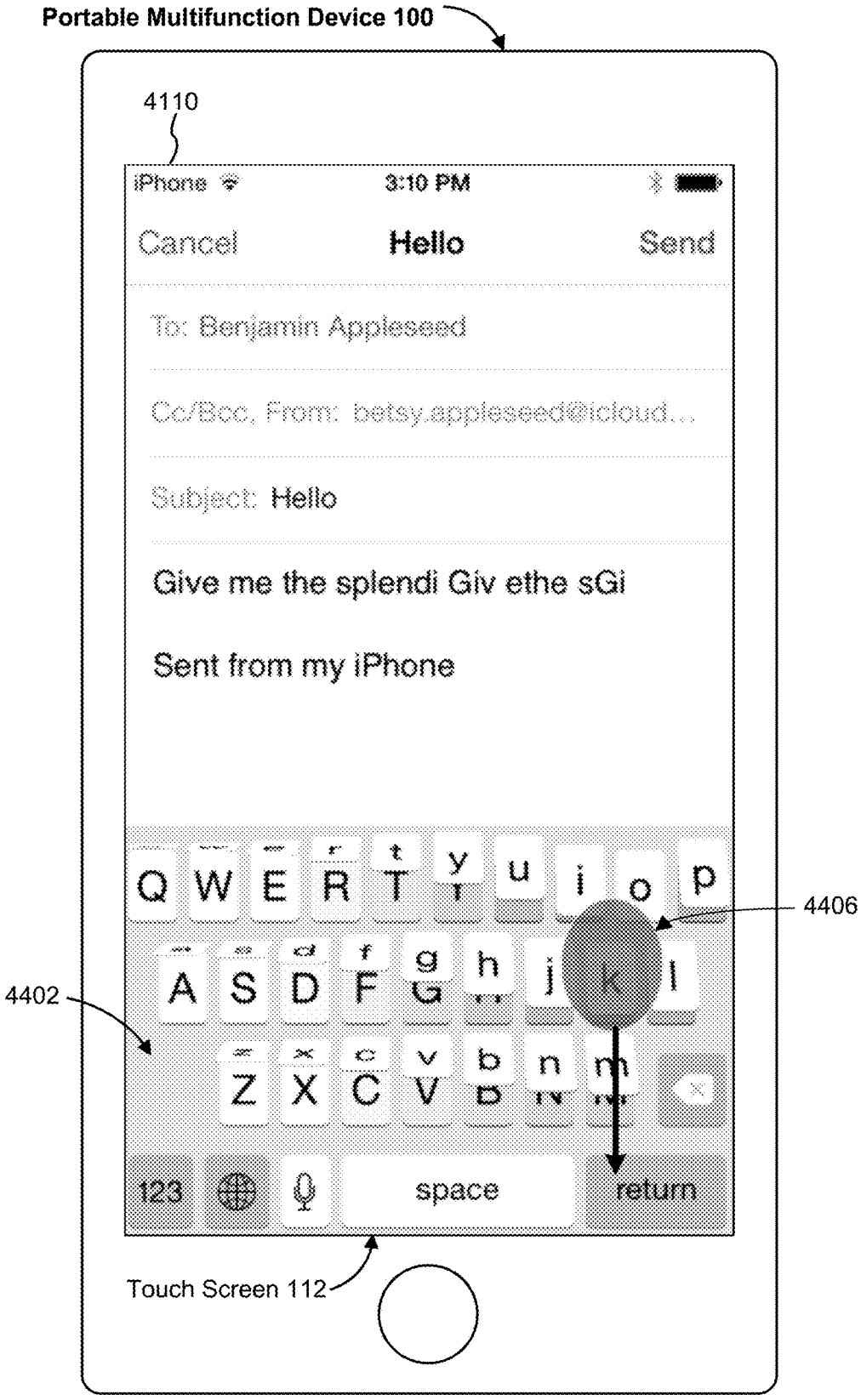

Portable Multifunction Device 100
4110
iPhone
3:10 PM
Cancel
Hello
Send
To: Benjamin Appleseed
Cc/Bcc, From: betsy.appleseed@icloud...
Subject: Hello
Give me the splendi Giv ethe sGi
Sent from my iPhone
4406
4402
space
return
Touch Screen 112

Figure 44F

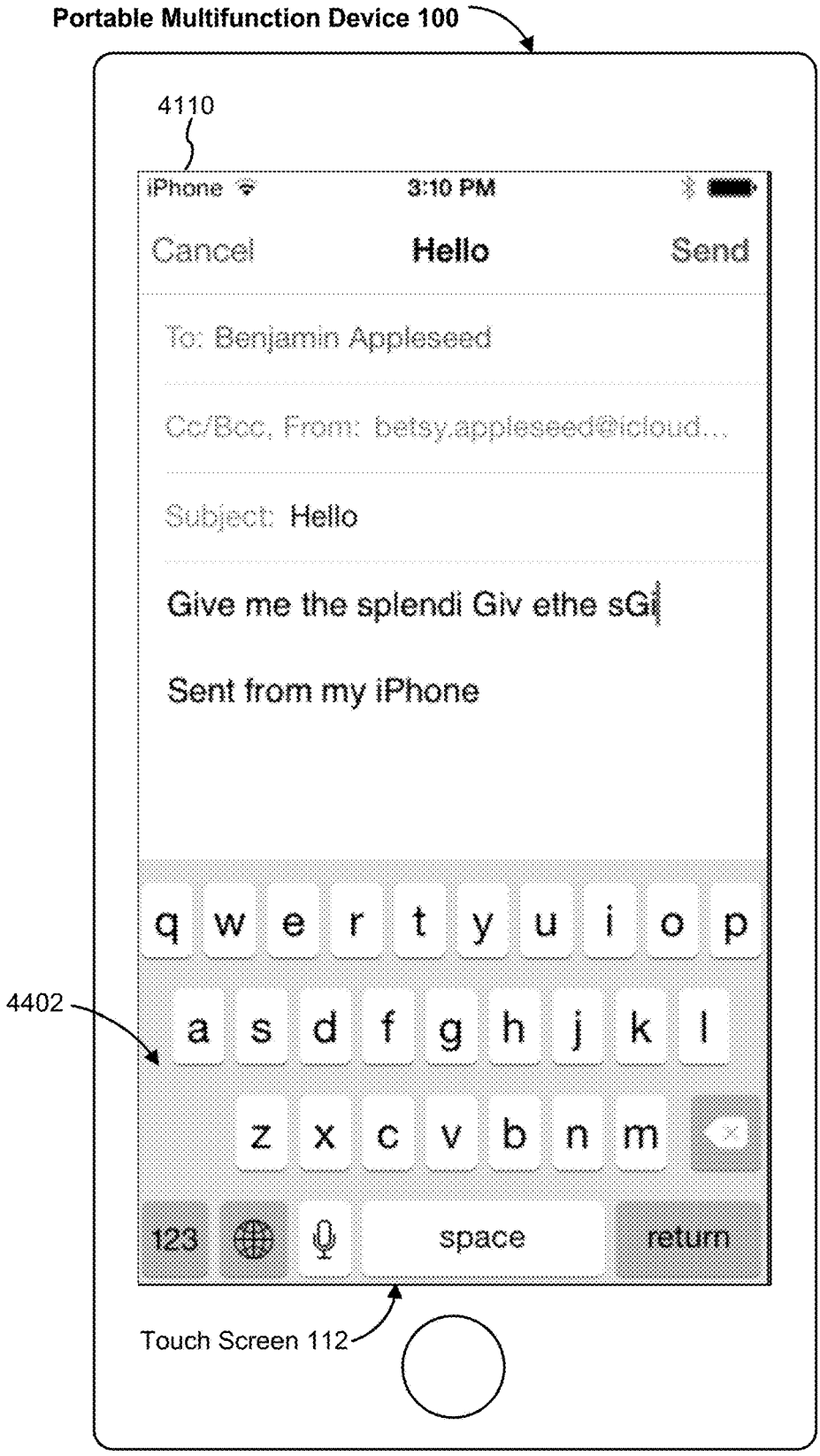

Portable Multifunction Device 100
4110
iPhone
3:10 PM
Cancel
Hello
Send
To: Benjamin Appleseed
Cc/Bcc, From: betsy.appleseed@icloud...
Subject: Hello
Give me the splendi Giv ethe sGi
Sent from my iPhone
q w e r t y u i o p
a s d f g h j k l
z x c v b n m
123
space
return
4402
Touch Screen 112

Figure 44G

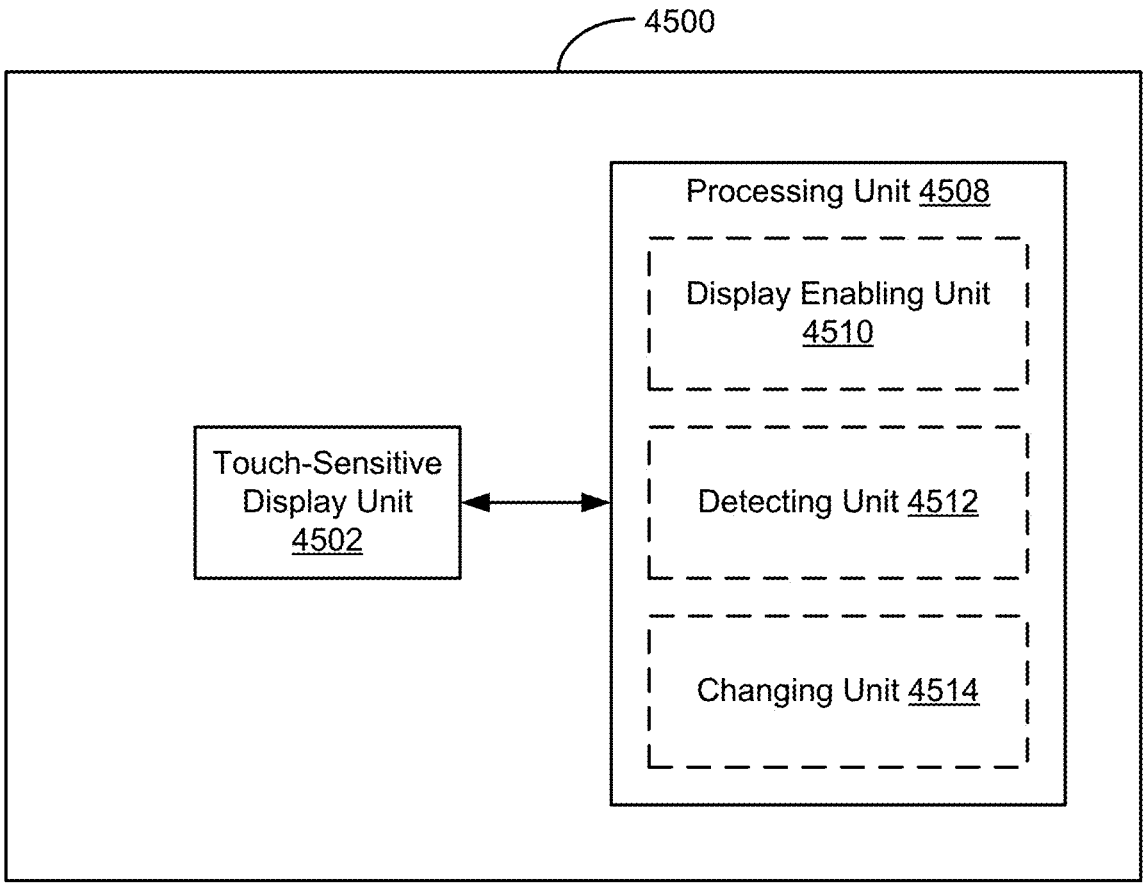

4500
Processing Unit 4508
Display Enabling Unit 4510
Detecting Unit 4512
Changing Unit 4514
Touch-Sensitive Display Unit 4502

Figure 45

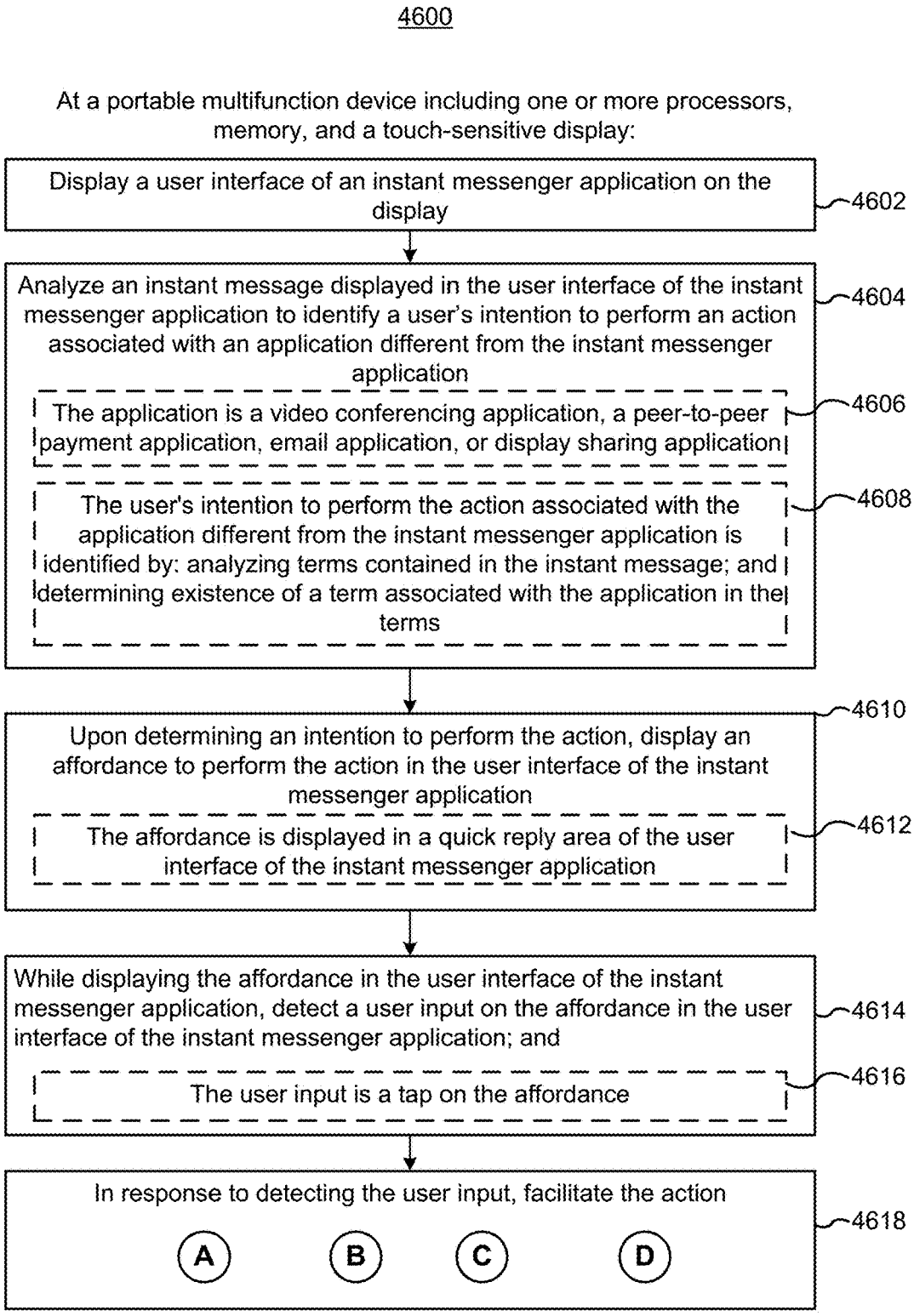

4600
At a portable multifunction device including one or more processors, memory, and a touch-sensitive display:
Display a user interface of an instant messenger application on the display
4602
Analyze an instant message displayed in the user interface of the instant messenger application to identify a user's intention to perform an action associated with an application different from the instant messenger application
4604
The application is a video conferencing application, a peer-to-peer payment application, email application, or display sharing application
4606
The user's intention to perform the action associated with the application different from the instant messenger application is identified by: analyzing terms contained in the instant message; and determining existence of a term associated with the application in the terms
4608
Upon determining an intention to perform the action, display an affordance to perform the action in the user interface of the instant messenger application
4610
The affordance is displayed in a quick reply area of the user interface of the instant messenger application
4612
While displaying the affordance in the user interface of the instant messenger application, detect a user input on the affordance in the user interface of the instant messenger application; and
4614
The user input is a tap on the affordance
4616
In response to detecting the user input, facilitate the action
4618
A
B
C
D

Figure 46A

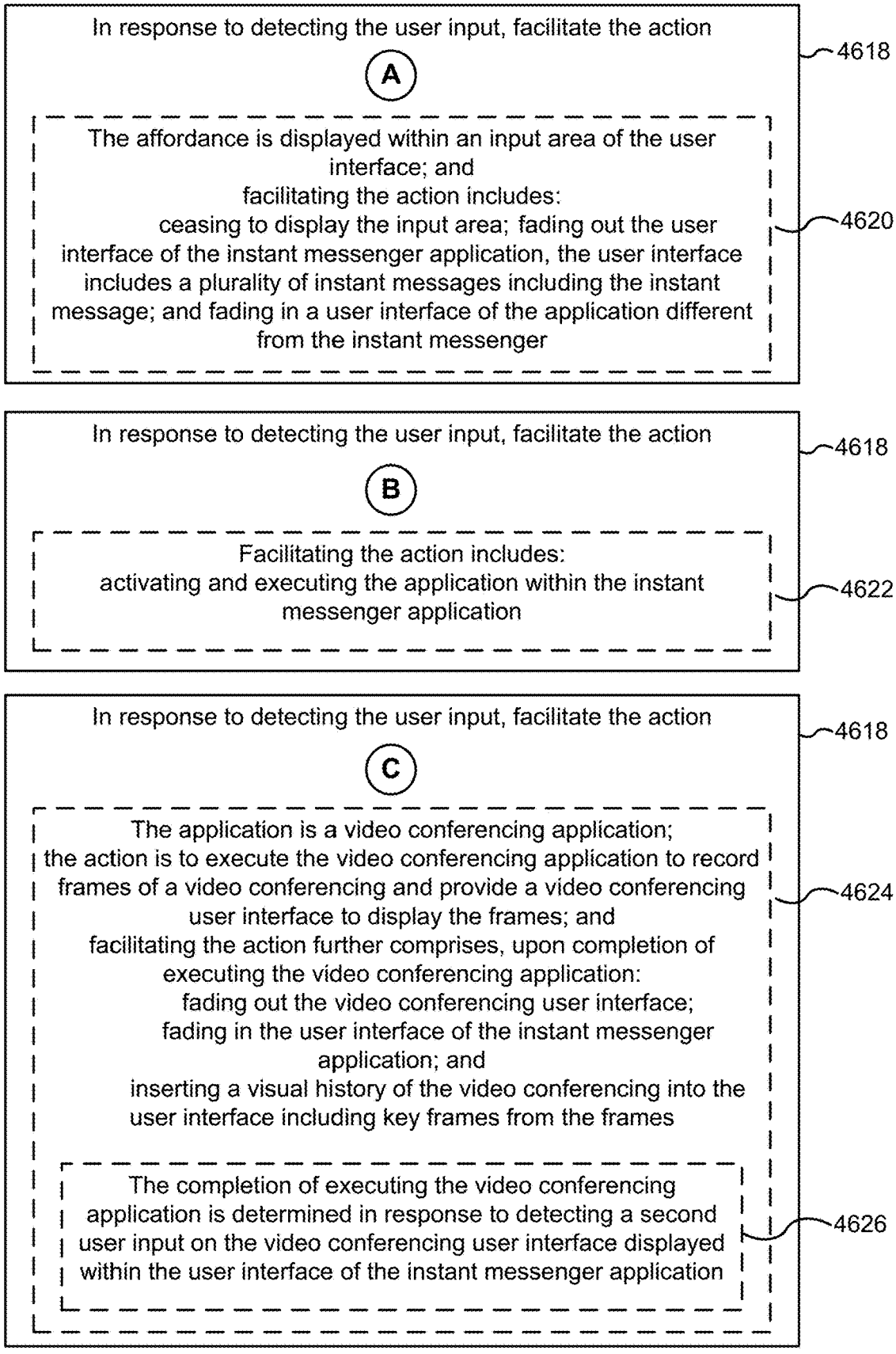

In response to detecting the user input, facilitate the action
A
The affordance is displayed within an input area of the user interface; and
facilitating the action includes:
ceasing to display the input area; fading out the user interface of the instant messenger application, the user interface includes a plurality of instant messages including the instant message; and fading in a user interface of the application different from the instant messenger
4618
4620
In response to detecting the user input, facilitate the action
B
Facilitating the action includes:
activating and executing the application within the instant messenger application
4618
4622
In response to detecting the user input, facilitate the action
C
The application is a video conferencing application;
the action is to execute the video conferencing application to record frames of a video conferencing and provide a video conferencing user interface to display the frames; and
facilitating the action further comprises, upon completion of executing the video conferencing application:
fading out the video conferencing user interface;
fading in the user interface of the instant messenger application; and
inserting a visual history of the video conferencing into the user interface including key frames from the frames
The completion of executing the video conferencing application is determined in response to detecting a second user input on the video conferencing user interface displayed within the user interface of the instant messenger application
4618
4624
4626

Figure 46B

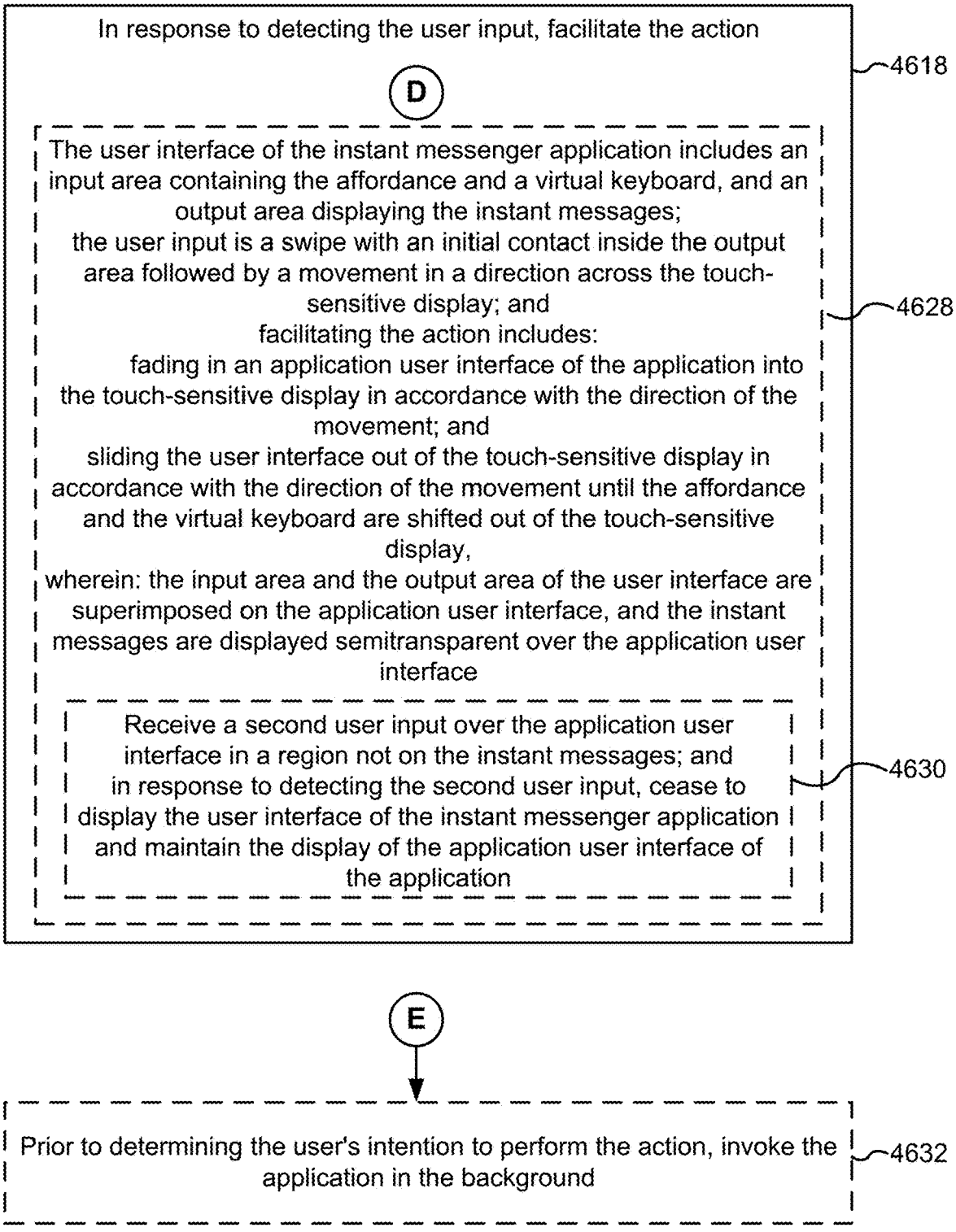

In response to detecting the user input, facilitate the action
4618
D
The user interface of the instant messenger application includes an input area containing the affordance and a virtual keyboard, and an output area displaying the instant messages;
the user input is a swipe with an initial contact inside the output area followed by a movement in a direction across the touch-sensitive display; and
facilitating the action includes:
fading in an application user interface of the application into the touch-sensitive display in accordance with the direction of the movement; and
sliding the user interface out of the touch-sensitive display in accordance with the direction of the movement until the affordance and the virtual keyboard are shifted out of the touch-sensitive display,
wherein: the input area and the output area of the user interface are superimposed on the application user interface, and the instant messages are displayed semitransparent over the application user interface
4628
Receive a second user input over the application user interface in a region not on the instant messages; and
in response to detecting the second user input, cease to display the user interface of the instant messenger application and maintain the display of the application user interface of the application
4630
E
Prior to determining the user's intention to perform the action, invoke the application in the background
4632

Figure 46C

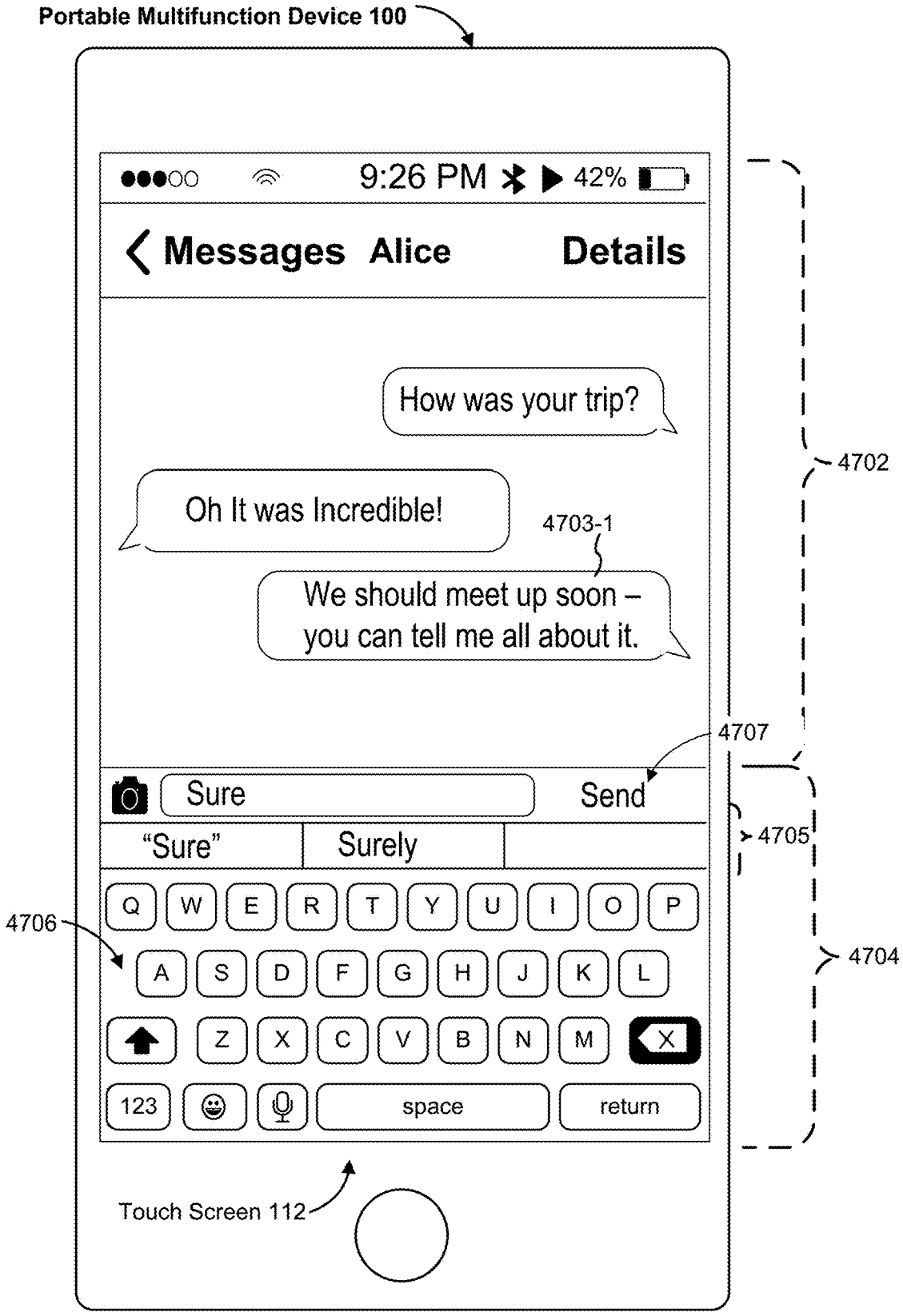

Portable Multifunction Device 100
9:26 PM
42%
Messages
Alice
Details
How was your trip?
Oh It was Incredible!
4703-1
We should meet up soon – you can tell me all about it.
4707
Sure
Send
"Sure"
Surely
Q W E R T Y U I O P
A S D F G H J K L
Z X C V B N M
123
space
return
4706
4702
4705
4704
Touch Screen 112

Figure 47A

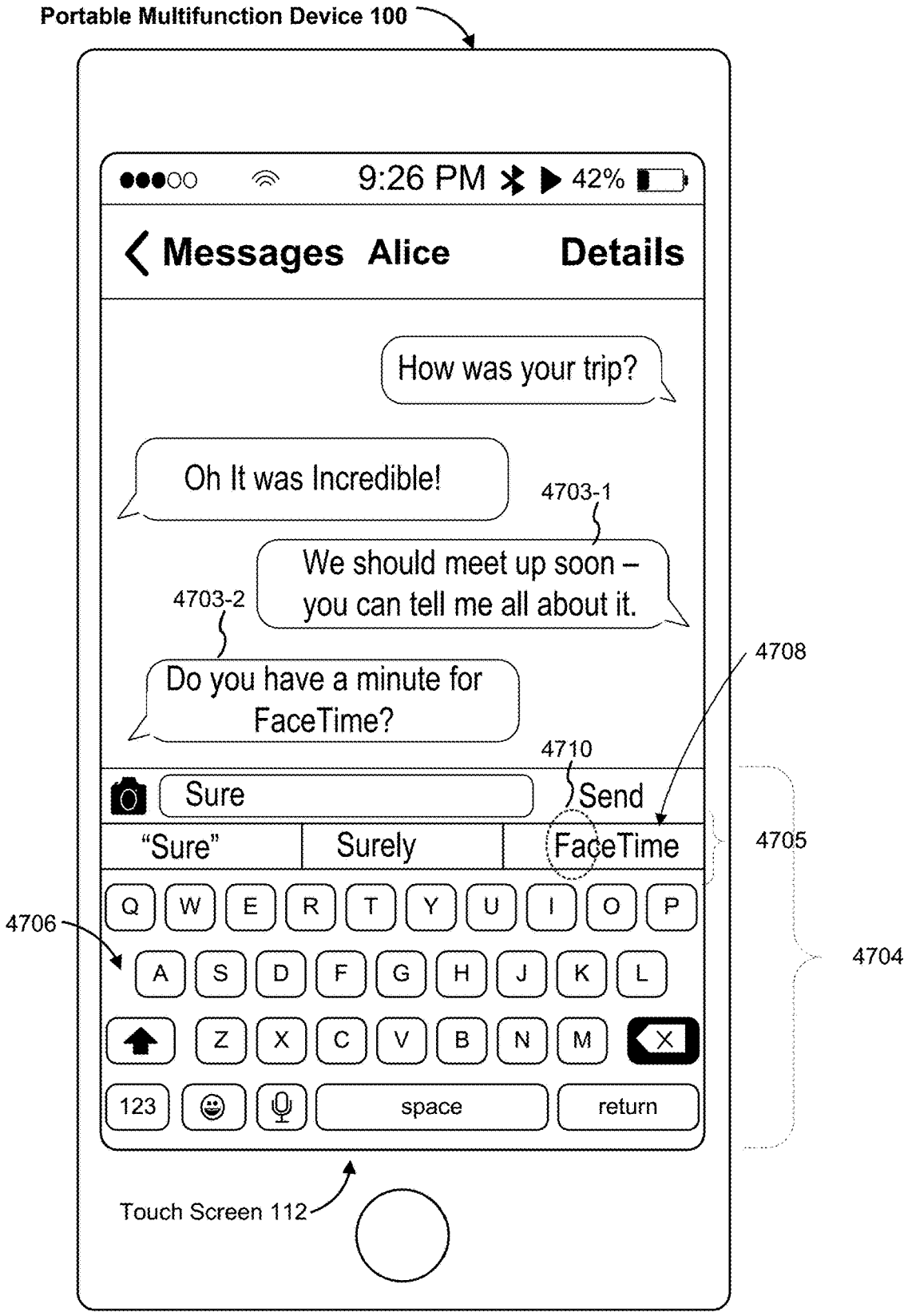

Portable Multifunction Device 100
9:26 PM
42%
Messages
Alice
Details
How was your trip?
Oh It was Incredible!
4703-1
We should meet up soon – you can tell me all about it.
4703-2
Do you have a minute for FaceTime?
4708
4710
Sure
Send
"Sure"
Surely
FaceTime
4705
4706
4704
Q W E R T Y U I O P
A S D F G H J K L
Z X C V B N M
123
space
return
Touch Screen 112

Figure 47B

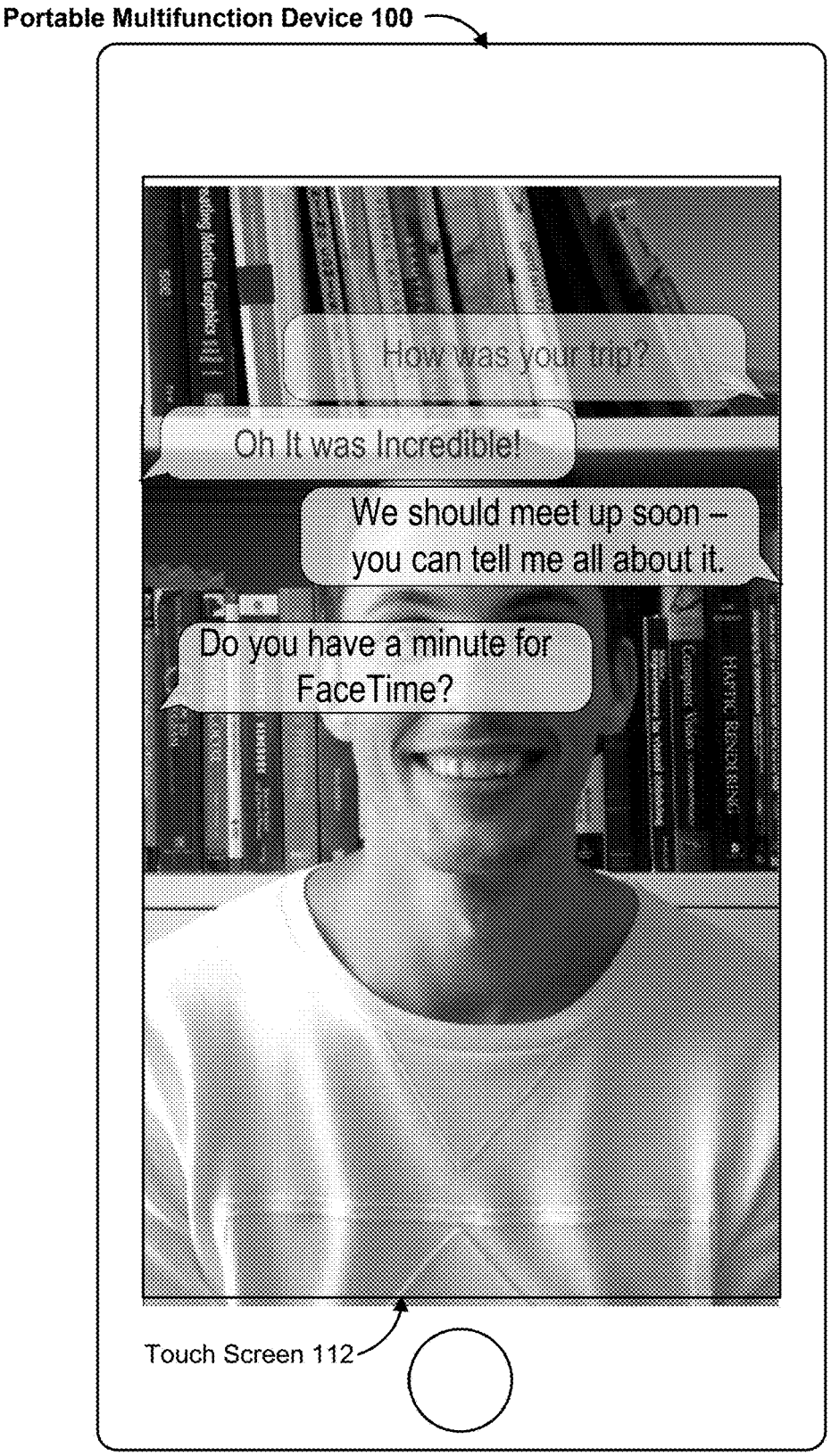

Portable Multifunction Device 100
How was your trip?
Oh It was Incredible!
We should meet up soon – you can tell me all about it.
Do you have a minute for FaceTime?
Touch Screen 112

Figure 47C

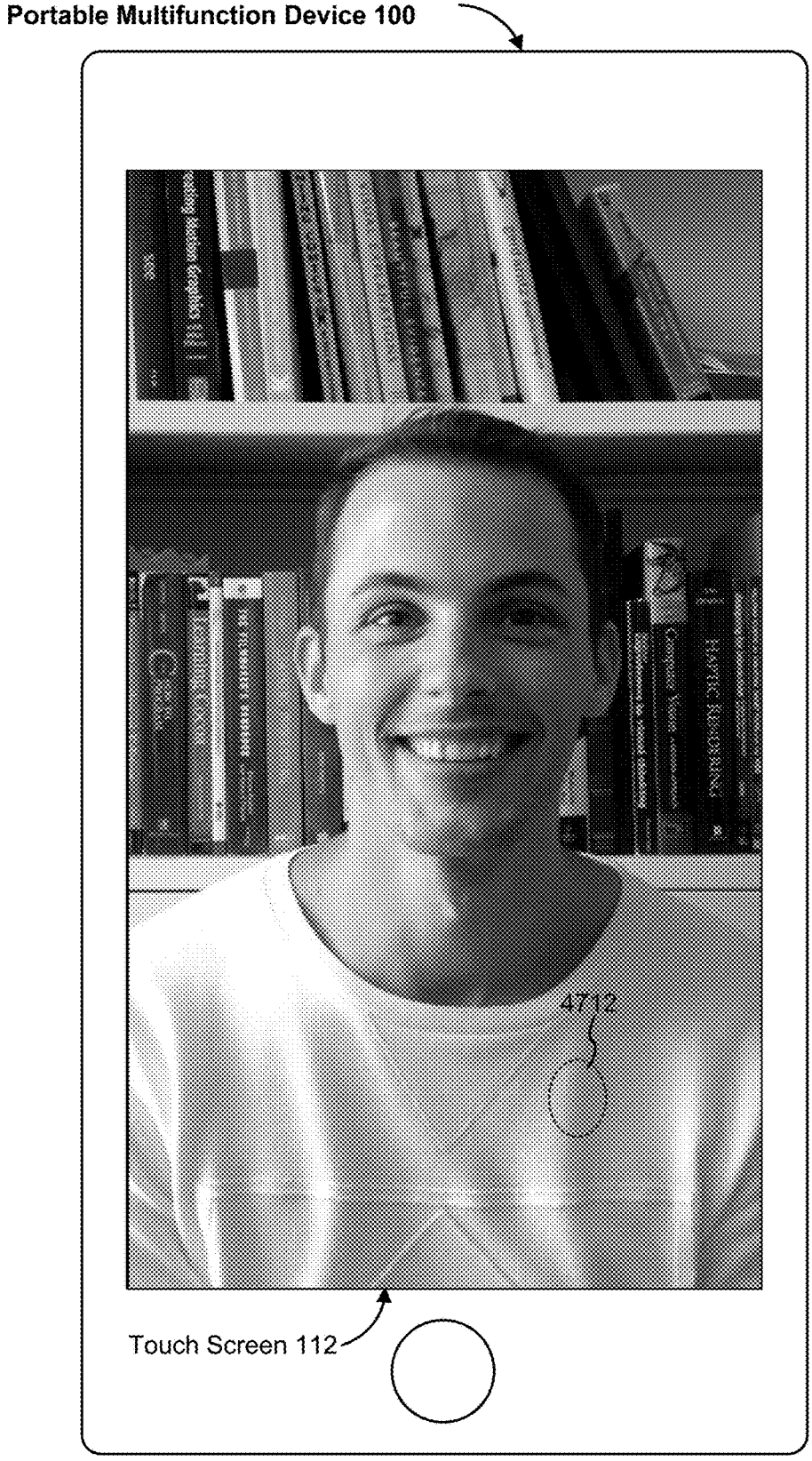


Figure 47D

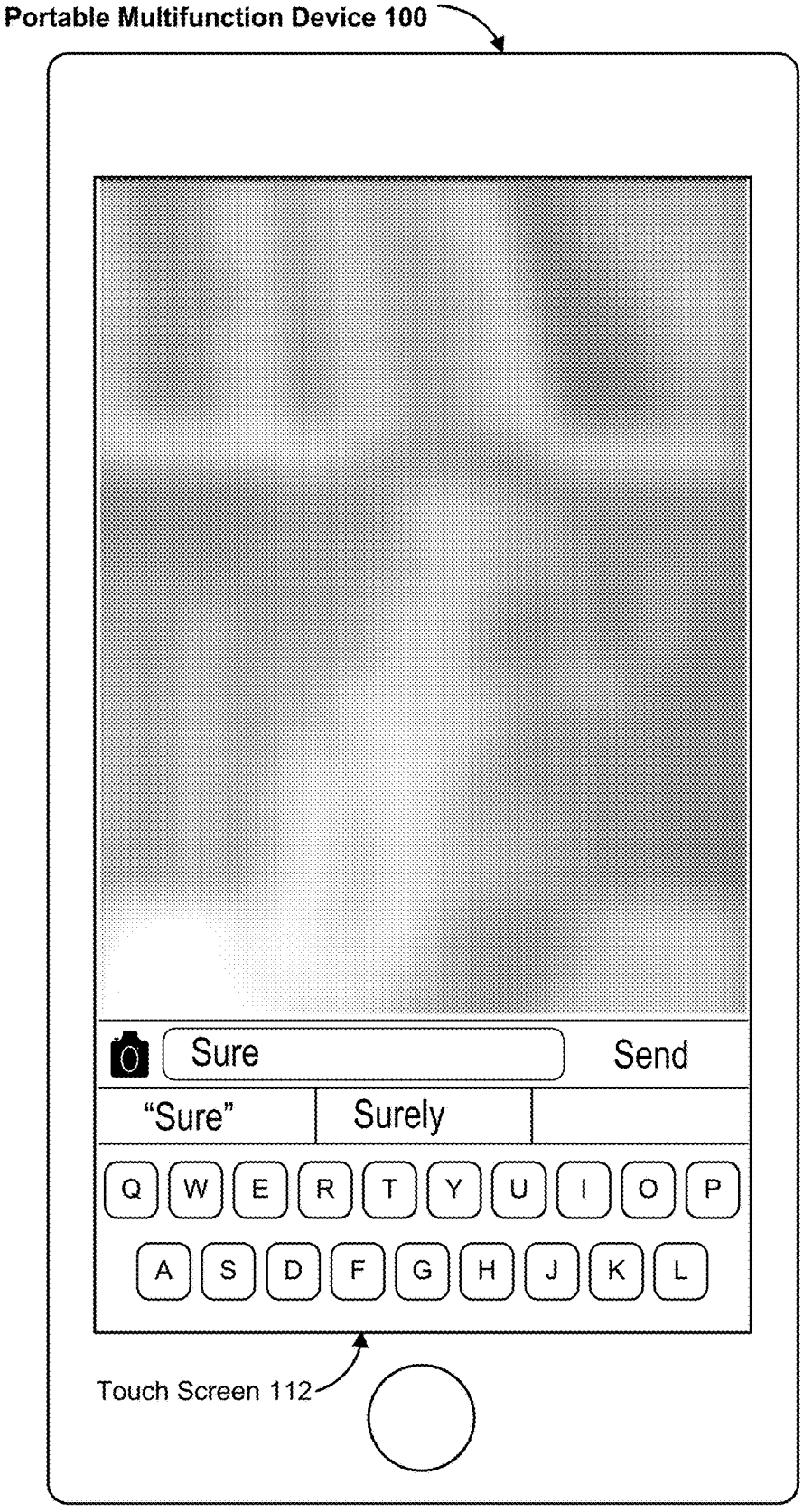

Portable Multifunction Device 100
Sure
Send
"Sure"
Surely
Q W E R T Y U I O P
A S D F G H J K L
Touch Screen 112

Figure 47E

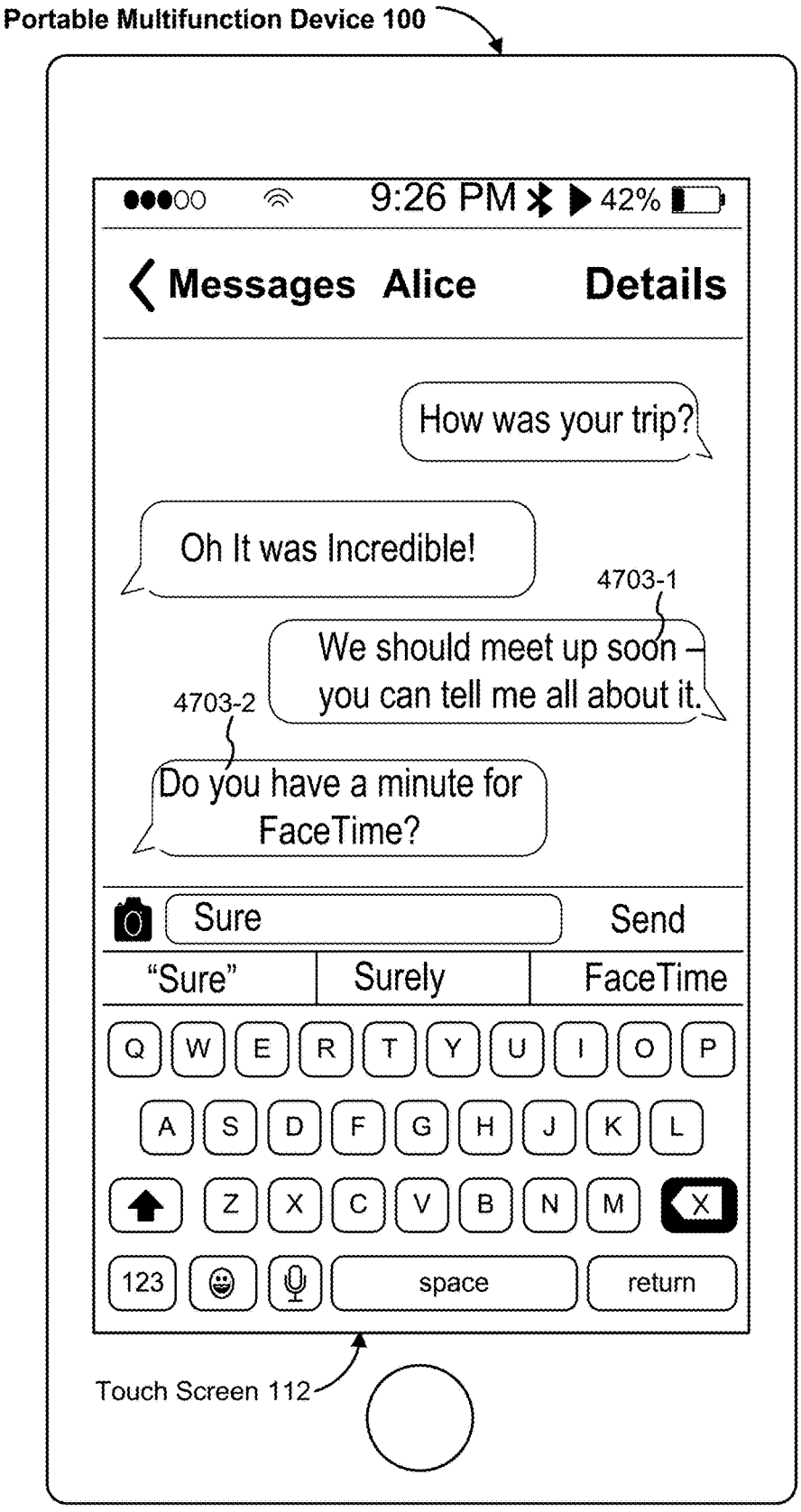

Portable Multifunction Device 100
9:26 PM
42%
Messages
Alice
Details
How was your trip?
Oh It was Incredible!
4703-1
We should meet up soon – you can tell me all about it.
4703-2
Do you have a minute for FaceTime?
Sure
Send
"Sure"
Surely
FaceTime
Q W E R T Y U I O P
A S D F G H J K L
Z X C V B N M
123
space
return
Touch Screen 112

Figure 47F

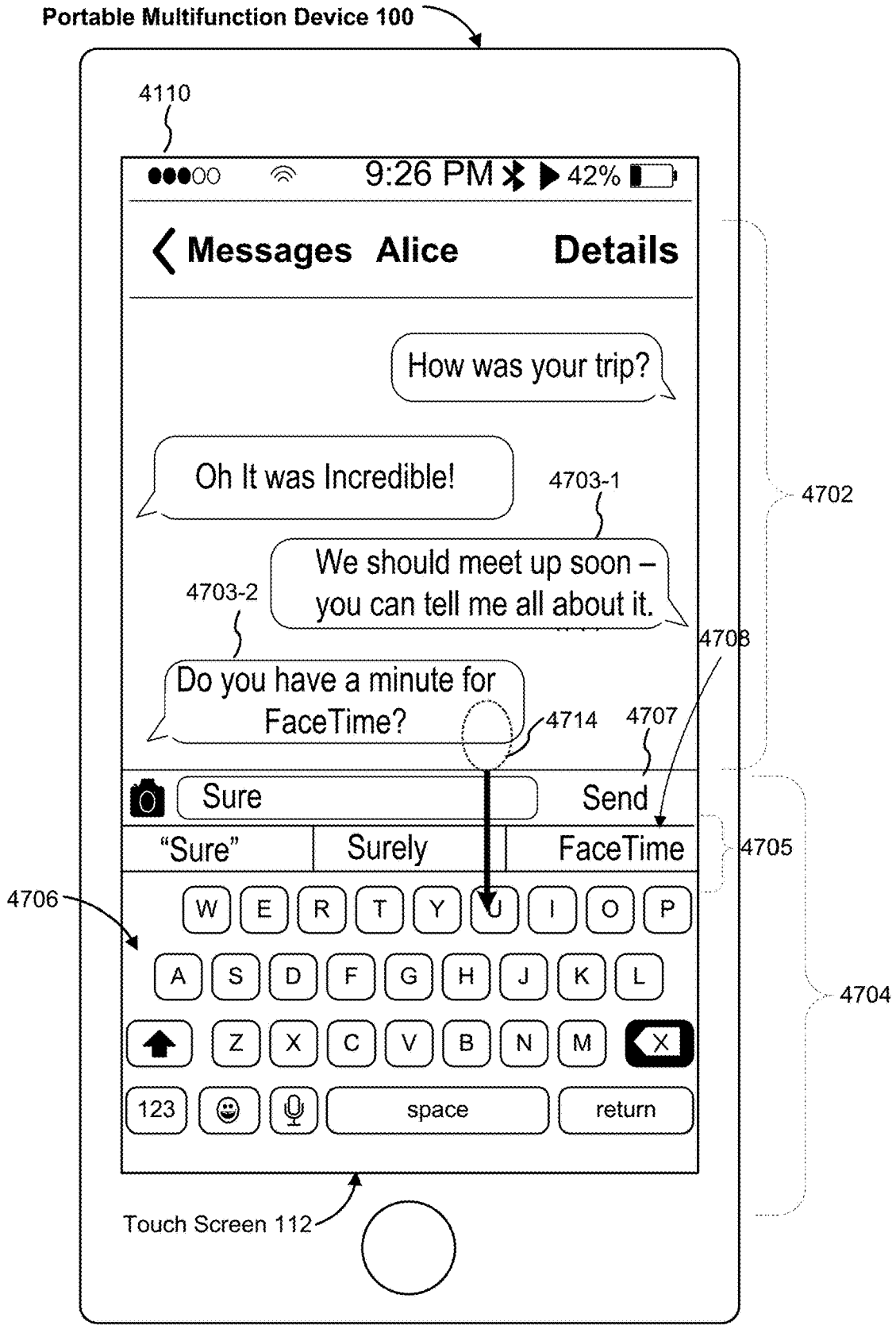

Portable Multifunction Device 100
4110
9:26 PM
42%
Messages
Alice
Details
How was your trip?
Oh It was Incredible!
4703-1
We should meet up soon – you can tell me all about it.
4703-2
Do you have a minute for FaceTime?
4714
4707
4708
Sure
Send
"Sure"
Surely
FaceTime
4705
4706
4702
4704
Touch Screen 112

Figure 47G

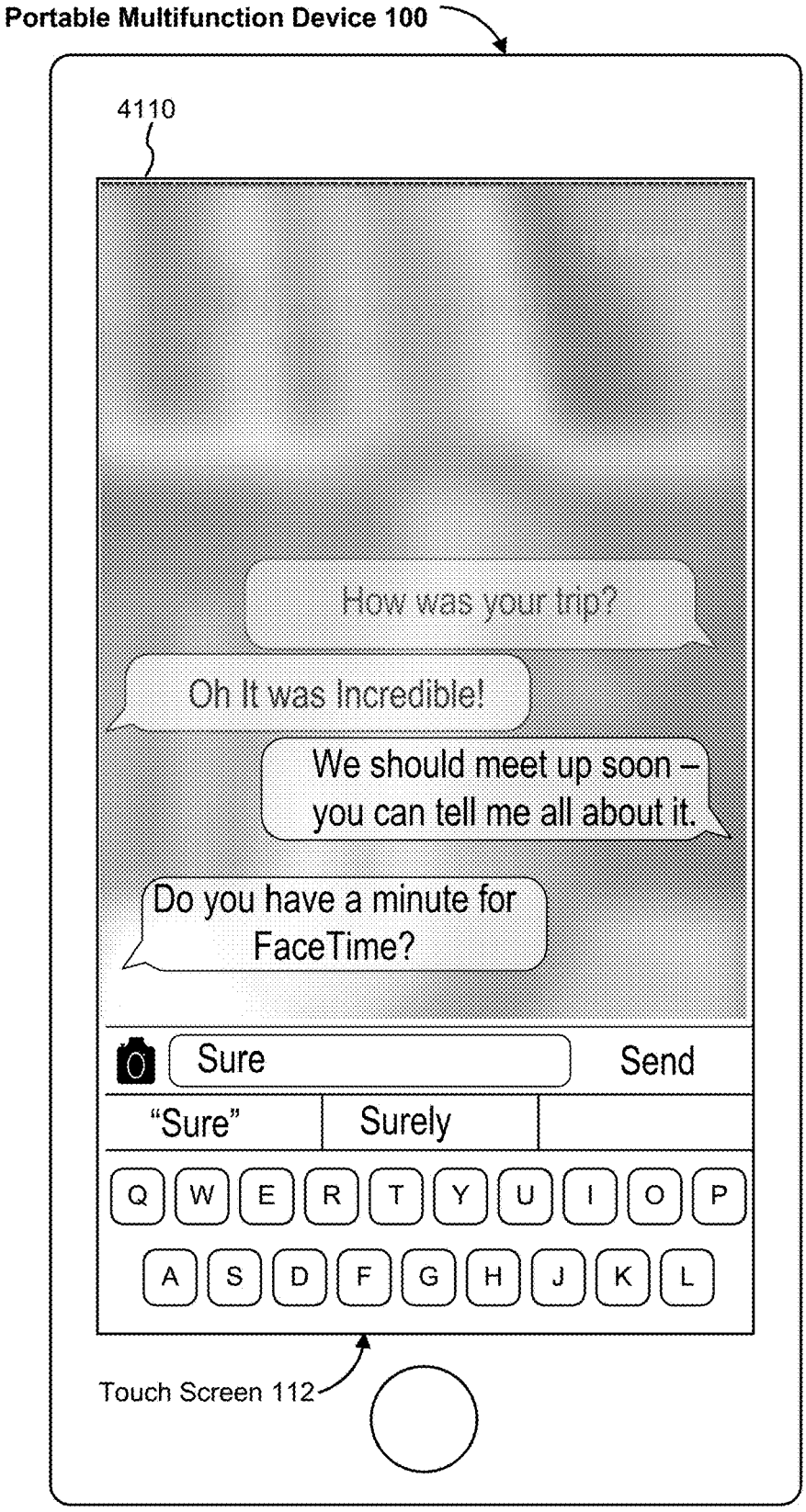

Portable Multifunction Device 100
4110
How was your trip?
Oh It was Incredible!
We should meet up soon – you can tell me all about it.
Do you have a minute for FaceTime?
Sure
Send
"Sure"
Surely
Q W E R T Y U I O P
A S D F G H J K L
Touch Screen 112

Figure 47H

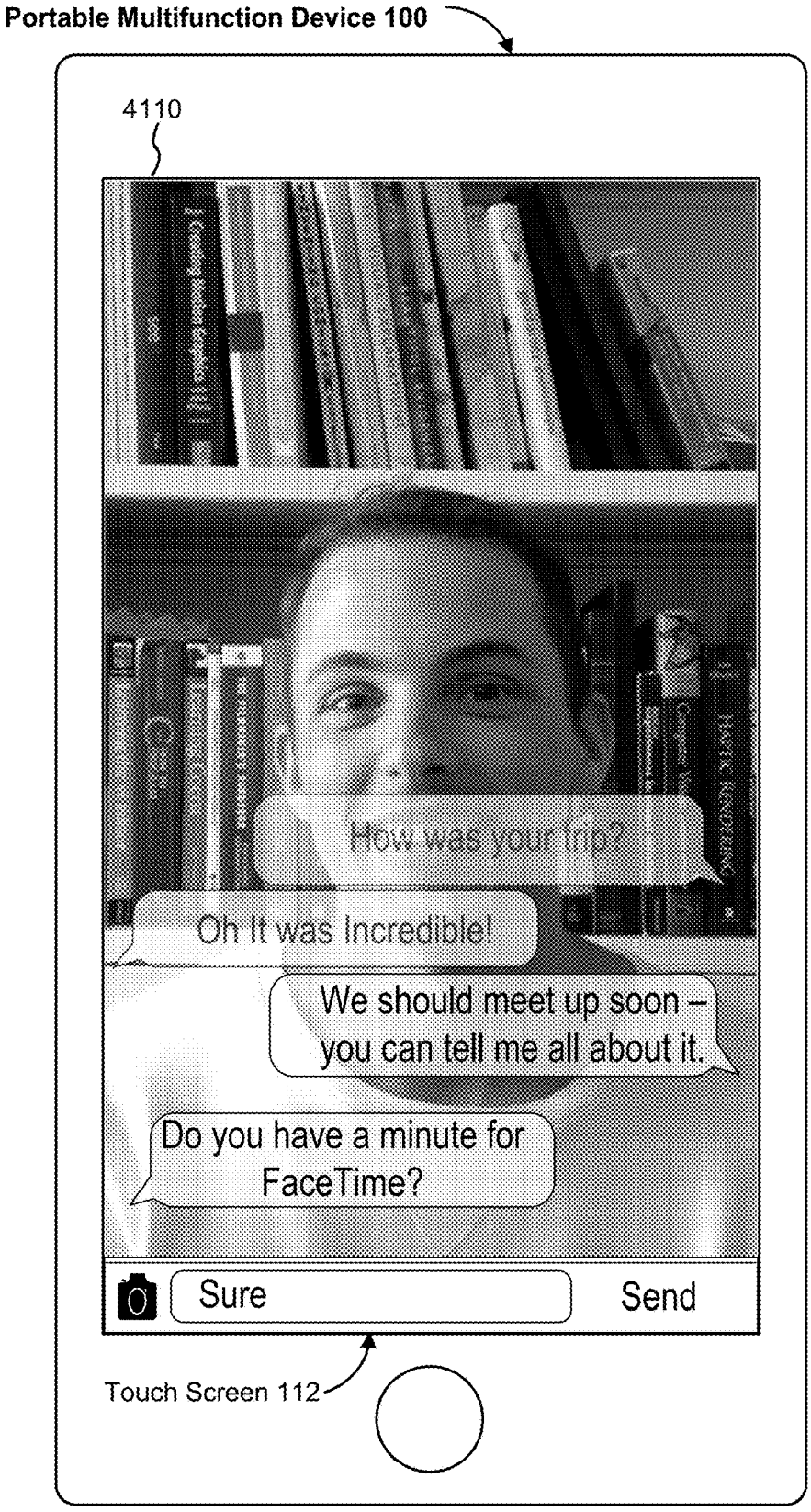

Portable Multifunction Device 100
4110
How was your trip?
Oh It was Incredible!
We should meet up soon – you can tell me all about it.
Do you have a minute for FaceTime?
Sure
Send
Touch Screen 112

Figure 47I

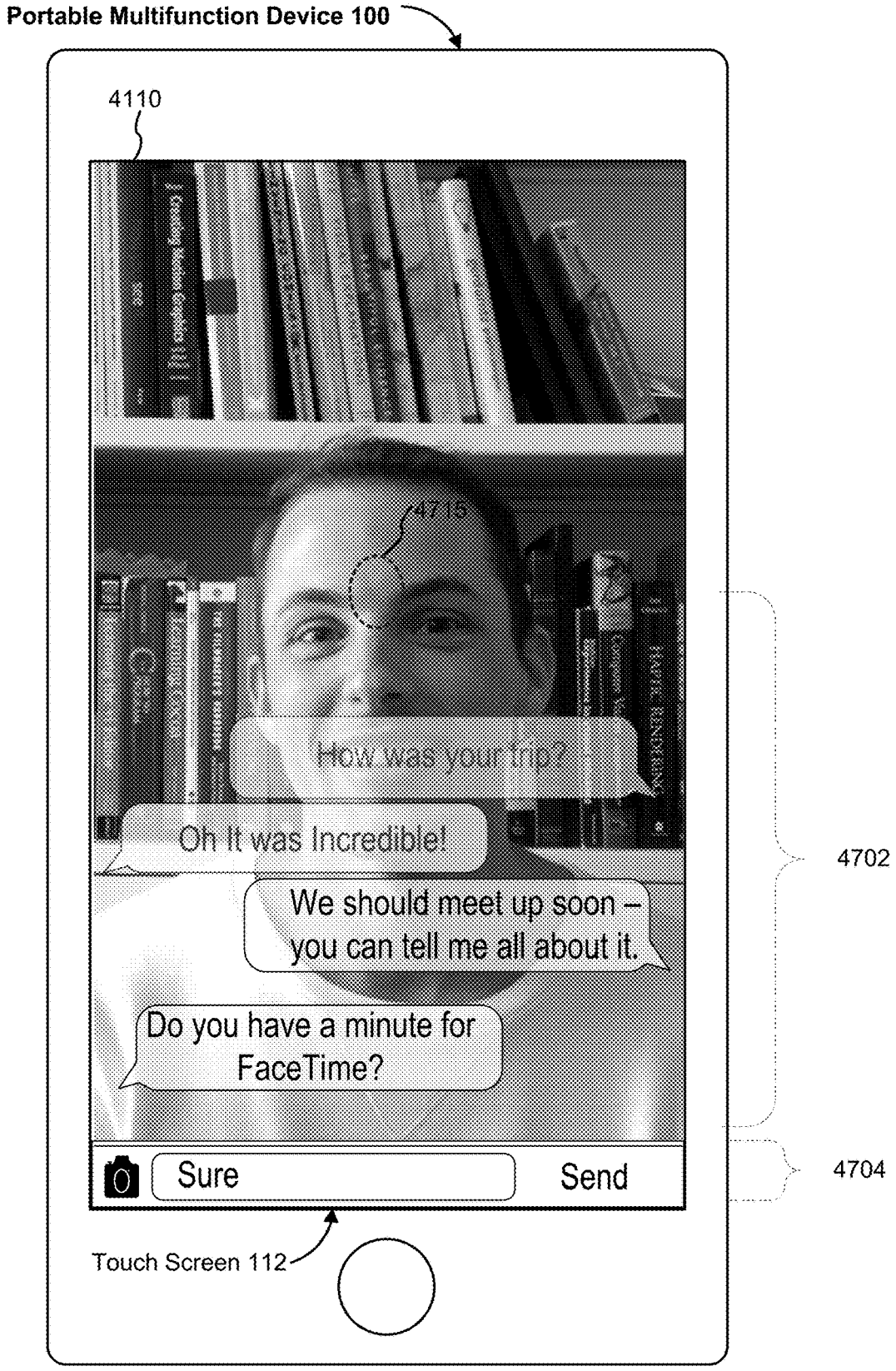

Portable Multifunction Device 100
4110
4715
How was your trip?
Oh It was Incredible!
We should meet up soon – you can tell me all about it.
Do you have a minute for FaceTime?
Sure
Send
4702
4704
Touch Screen 112

Figure 47J

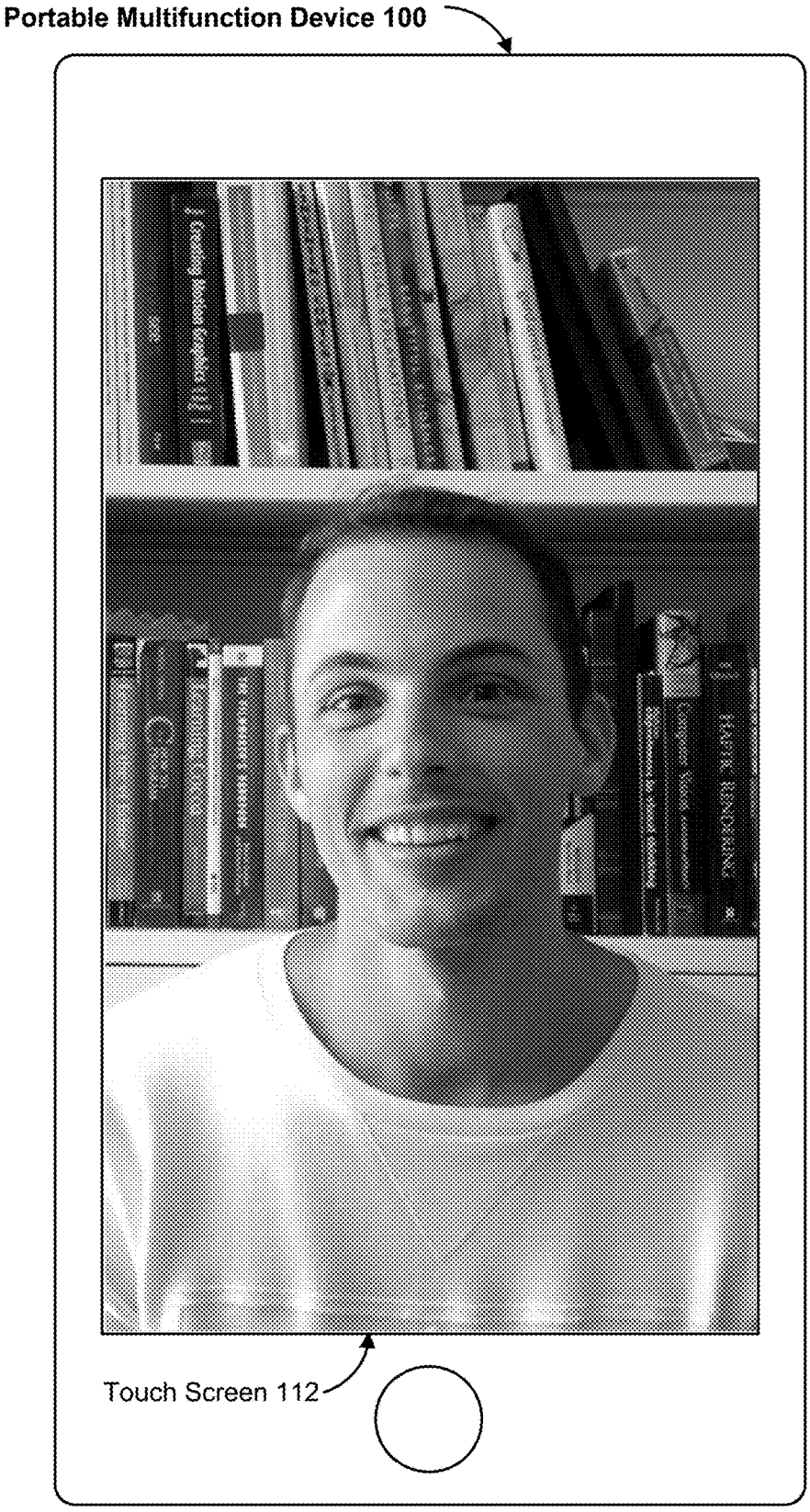


Figure 47K

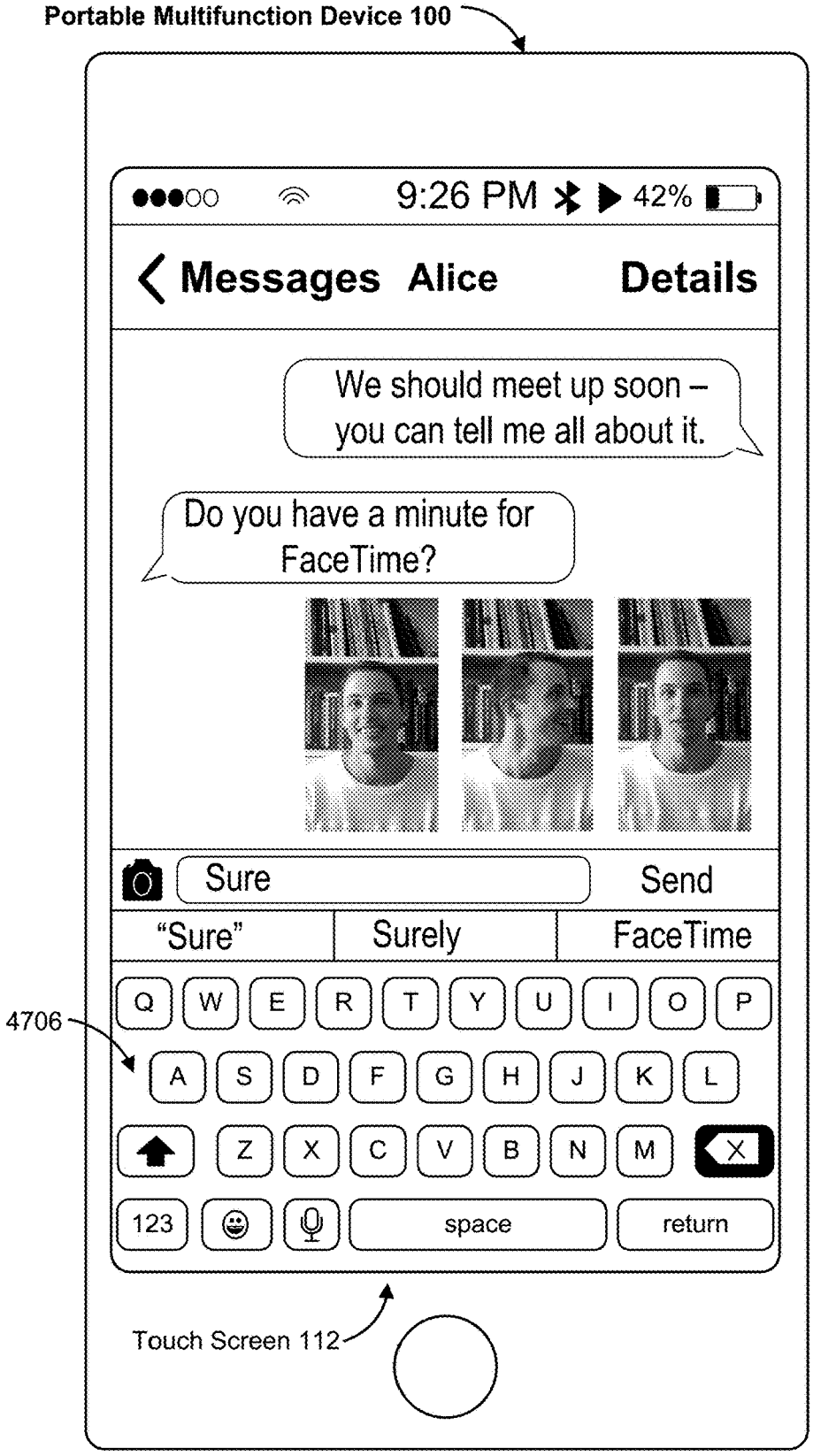

Portable Multifunction Device 100
9:26 PM
42%
Messages
Alice
Details
We should meet up soon – you can tell me all about it.
Do you have a minute for FaceTime?
Sure
Send
"Sure"
Surely
FaceTime
4706
Q W E R T Y U I O P
A S D F G H J K L
Z X C V B N M
123
space
return
Touch Screen 112

Figure 47L

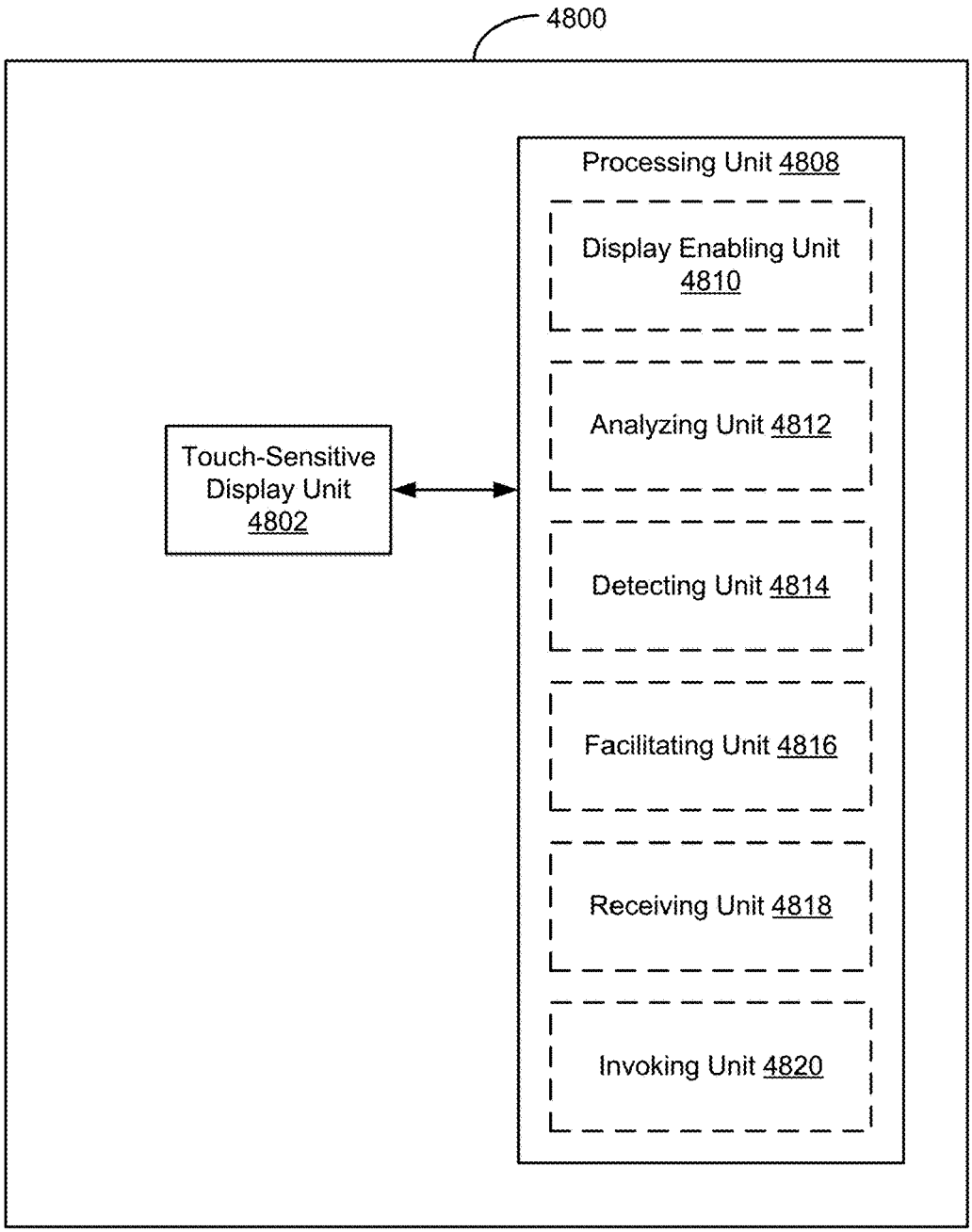

4800
Processing Unit 4808
Display Enabling Unit 4810
Analyzing Unit 4812
Detecting Unit 4814
Facilitating Unit 4816
Receiving Unit 4818
Invoking Unit 4820
Touch-Sensitive Display Unit 4802

Figure 48

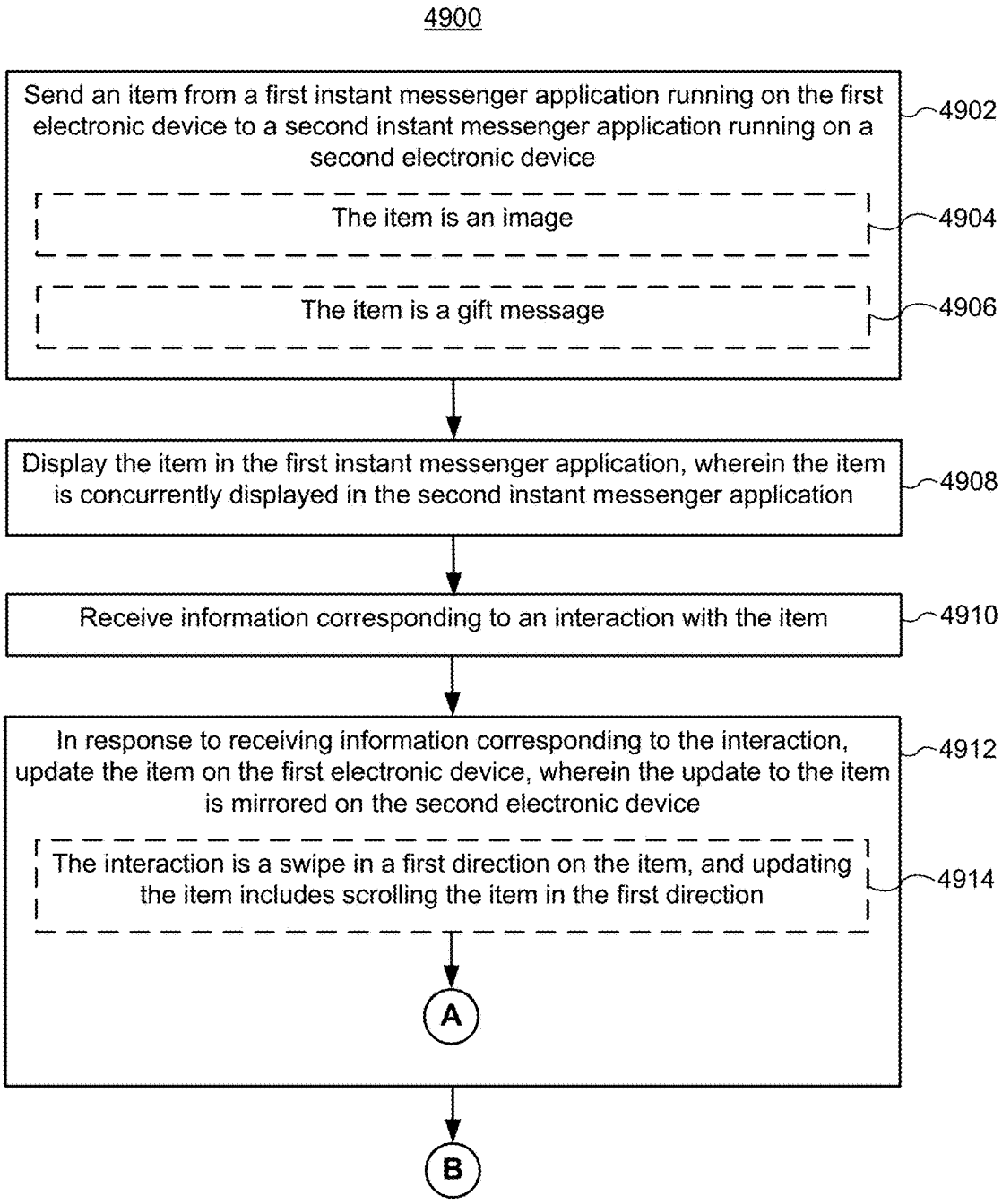

4900
Send an item from a first instant messenger application running on the first electronic device to a second instant messenger application running on a second electronic device
4902
The item is an image
4904
The item is a gift message
4906
Display the item in the first instant messenger application, wherein the item is concurrently displayed in the second instant messenger application
4908
Receive information corresponding to an interaction with the item
4910
In response to receiving information corresponding to the interaction, update the item on the first electronic device, wherein the update to the item is mirrored on the second electronic device
4912
The interaction is a swipe in a first direction on the item, and updating the item includes scrolling the item in the first direction
4914
A
B

Figure 49A

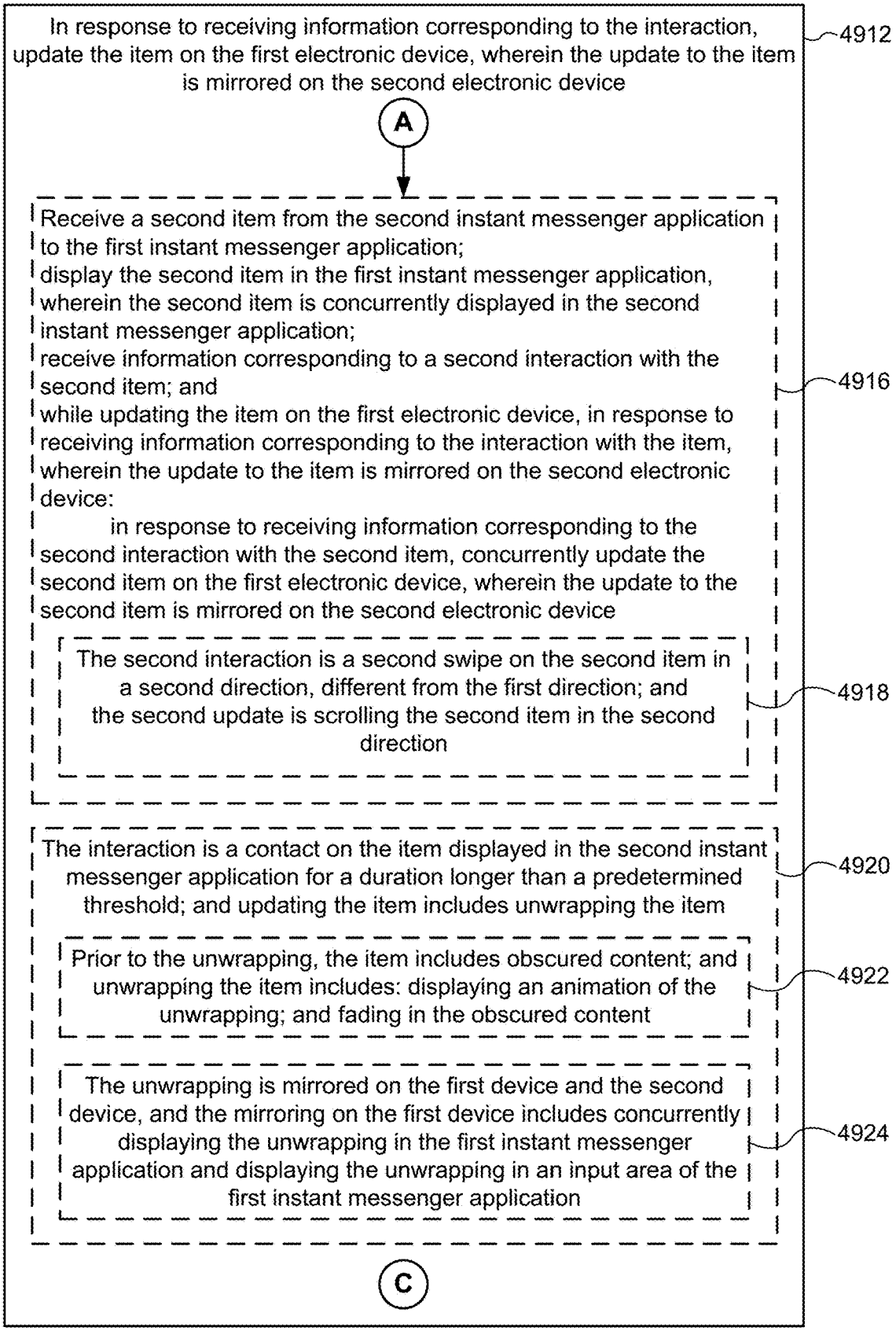

In response to receiving information corresponding to the interaction, update the item on the first electronic device, wherein the update to the item is mirrored on the second electronic device
4912
A
Receive a second item from the second instant messenger application to the first instant messenger application;
display the second item in the first instant messenger application, wherein the second item is concurrently displayed in the second instant messenger application;
receive information corresponding to a second interaction with the second item; and
while updating the item on the first electronic device, in response to receiving information corresponding to the interaction with the item, wherein the update to the item is mirrored on the second electronic device:
in response to receiving information corresponding to the second interaction with the second item, concurrently update the second item on the first electronic device, wherein the update to the second item is mirrored on the second electronic device
4916
The second interaction is a second swipe on the second item in a second direction, different from the first direction; and the second update is scrolling the second item in the second direction
4918
The interaction is a contact on the item displayed in the second instant messenger application for a duration longer than a predetermined threshold; and updating the item includes unwrapping the item
4920
Prior to the unwrapping, the item includes obscured content; and unwrapping the item includes: displaying an animation of the unwrapping; and fading in the obscured content
4922
The unwrapping is mirrored on the first device and the second device, and the mirroring on the first device includes concurrently displaying the unwrapping in the first instant messenger application and displaying the unwrapping in an input area of the first instant messenger application
4924
C

Figure 49B

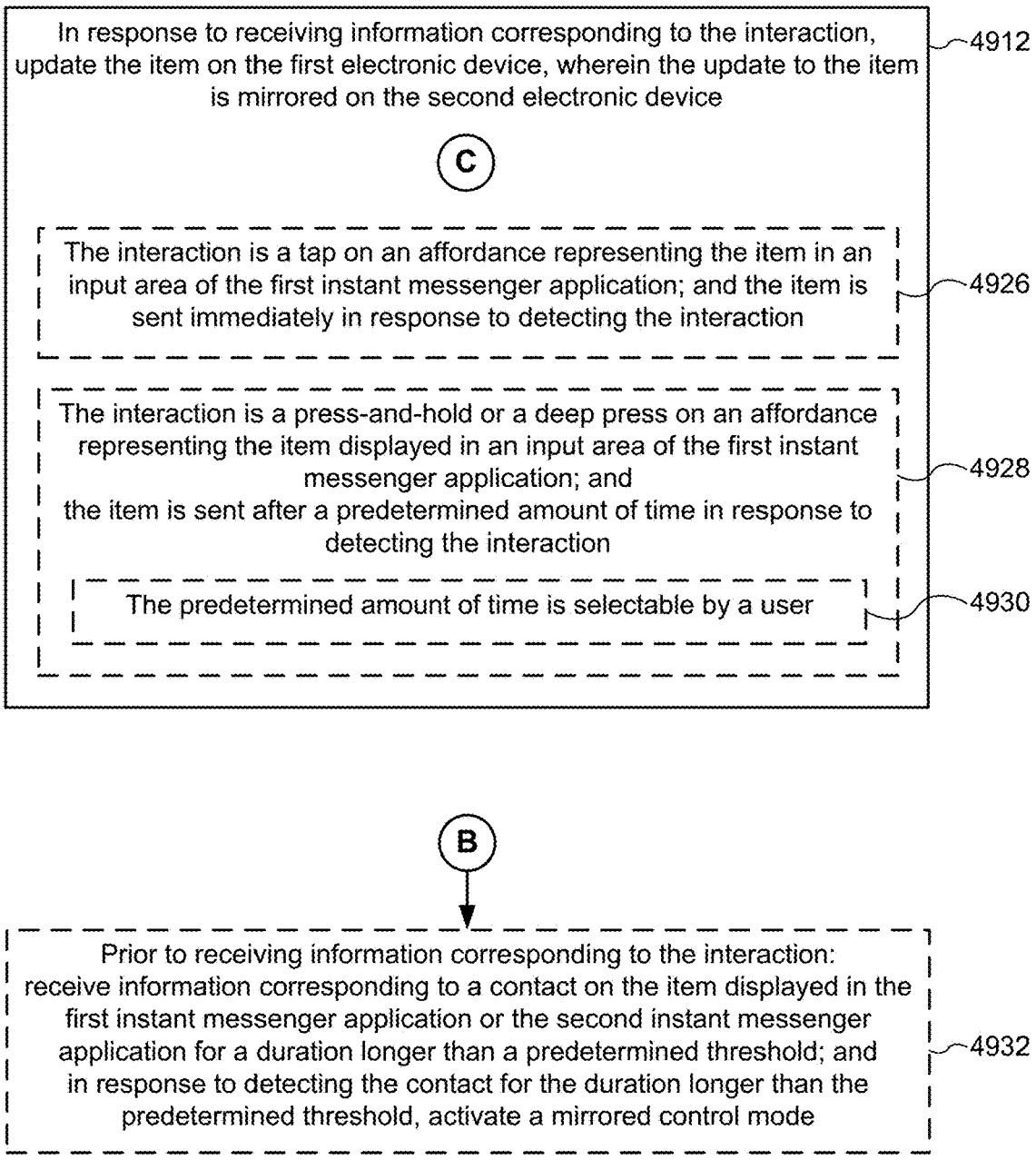

In response to receiving information corresponding to the interaction, update the item on the first electronic device, wherein the update to the item is mirrored on the second electronic device
4912
C
The interaction is a tap on an affordance representing the item in an input area of the first instant messenger application; and the item is sent immediately in response to detecting the interaction
4926
The interaction is a press-and-hold or a deep press on an affordance representing the item displayed in an input area of the first instant messenger application; and
the item is sent after a predetermined amount of time in response to detecting the interaction
4928
The predetermined amount of time is selectable by a user
4930
B
Prior to receiving information corresponding to the interaction:
receive information corresponding to a contact on the item displayed in the first instant messenger application or the second instant messenger application for a duration longer than a predetermined threshold; and
in response to detecting the contact for the duration longer than the predetermined threshold, activate a mirrored control mode
4932

Figure 49C

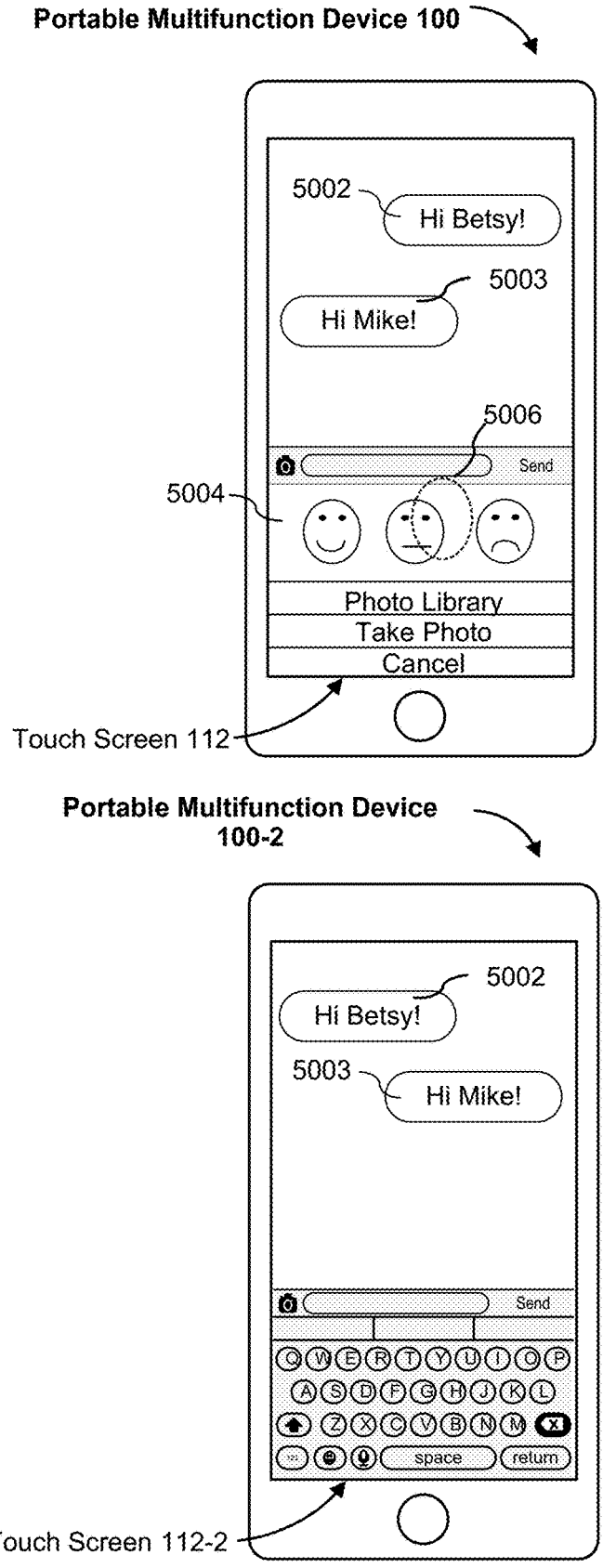

Portable Multifunction Device 100
5002
Hi Betsy!
5003
Hi Mike!
5006
Send
5004
Photo Library
Take Photo
Cancel
Touch Screen 112
Portable Multifunction Device 100-2
5002
Hi Betsy!
5003
Hi Mike!
Send
space
return
Touch Screen 112-2

Figure 50A

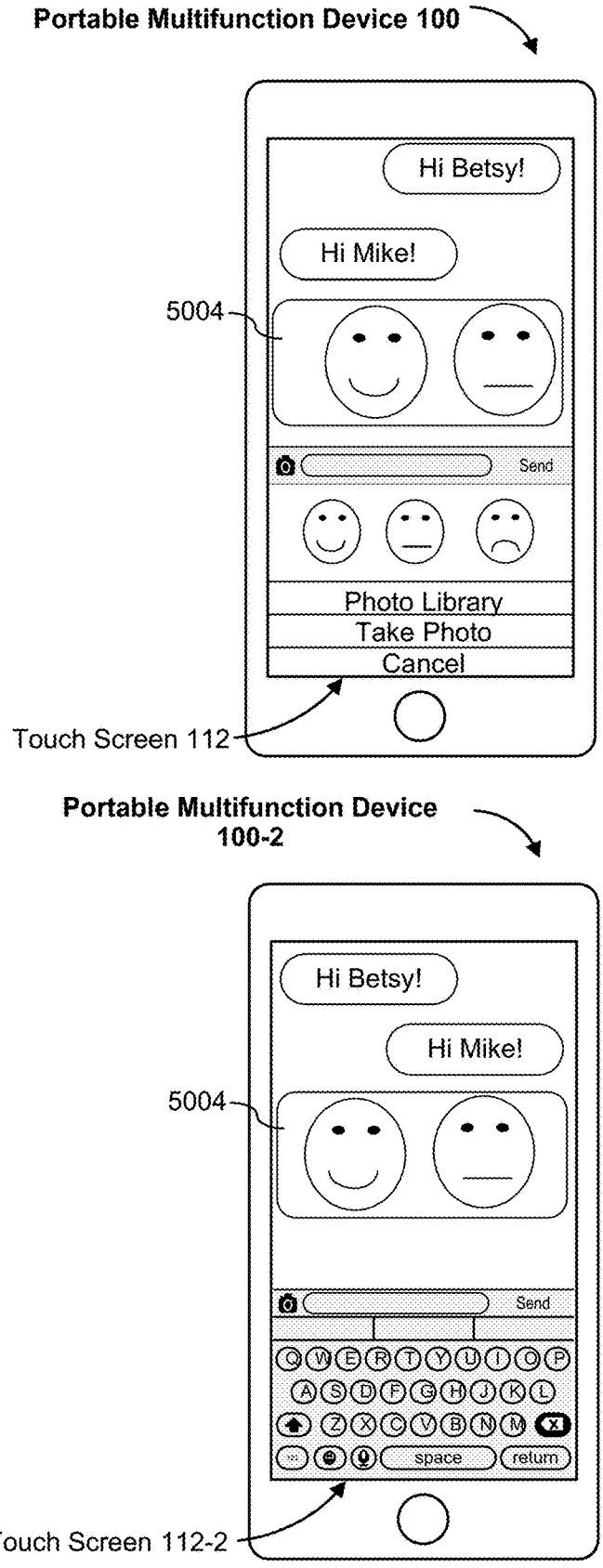

Portable Multifunction Device 100
Hi Betsy!
Hi Mike!
5004
Send
Photo Library
Take Photo
Cancel
Touch Screen 112
Portable Multifunction Device 100-2
Hi Betsy!
Hi Mike!
5004
Send
space
return
Touch Screen 112-2

Figure 50B

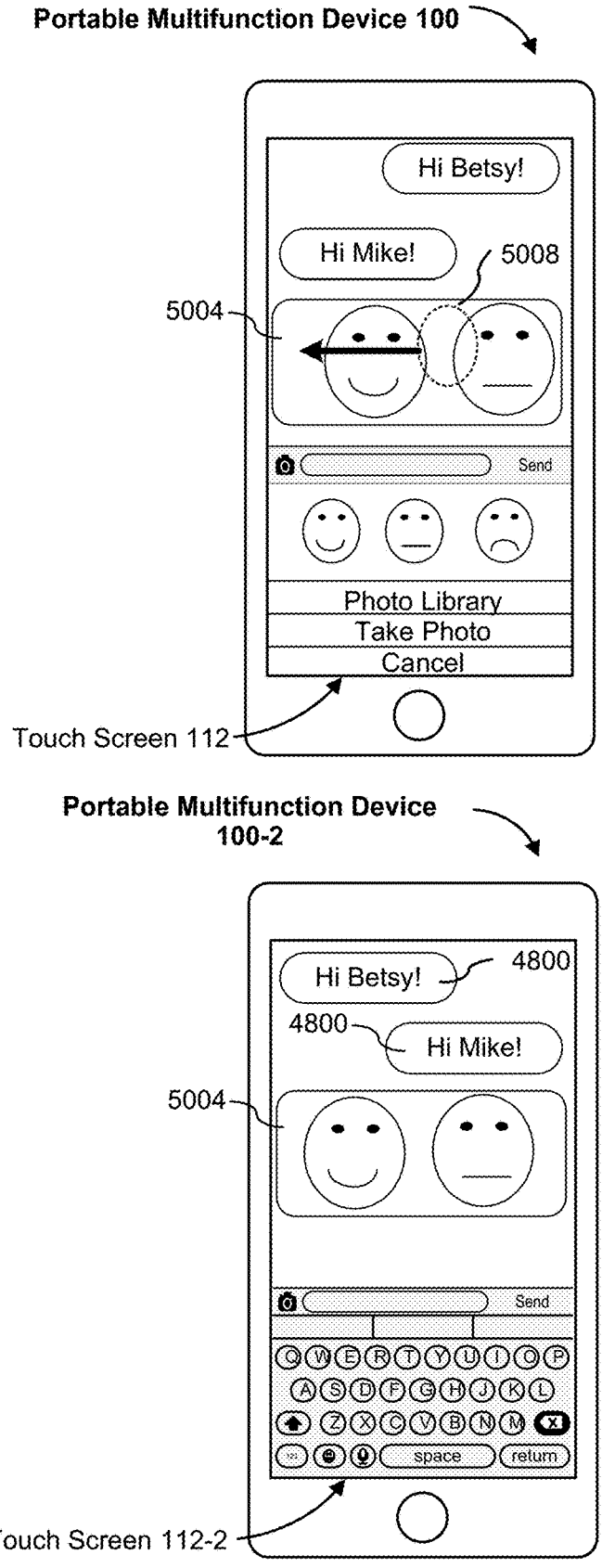

Portable Multifunction Device 100
Hi Betsy!
Hi Mike!
5008
5004
Send
Photo Library
Take Photo
Cancel
Touch Screen 112
Portable Multifunction Device 100-2
Hi Betsy!
4800
4800
Hi Mike!
5004
Send
space
return
Touch Screen 112-2

Figure 50C

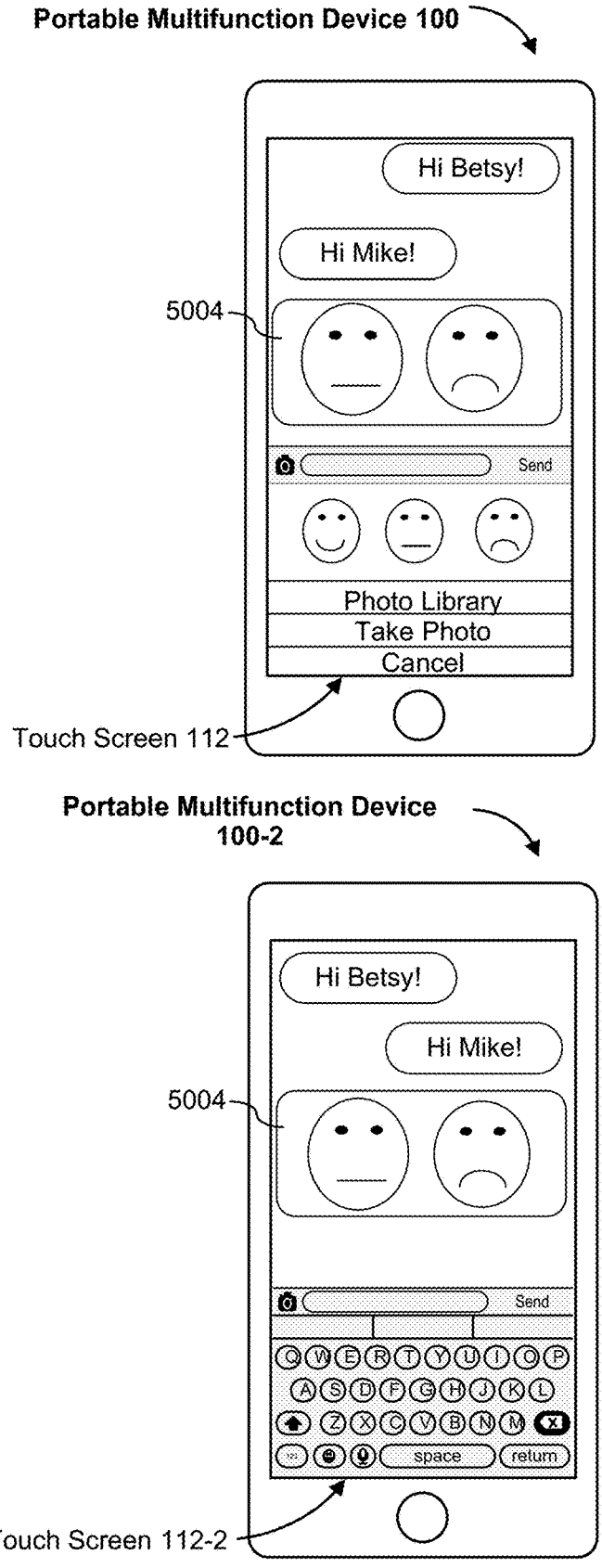

Portable Multifunction Device 100
Hi Betsy!
Hi Mike!
5004
Send
Photo Library
Take Photo
Cancel
Touch Screen 112
Portable Multifunction Device 100-2
Hi Betsy!
Hi Mike!
5004
Send
space
return
Touch Screen 112-2

Figure 50D

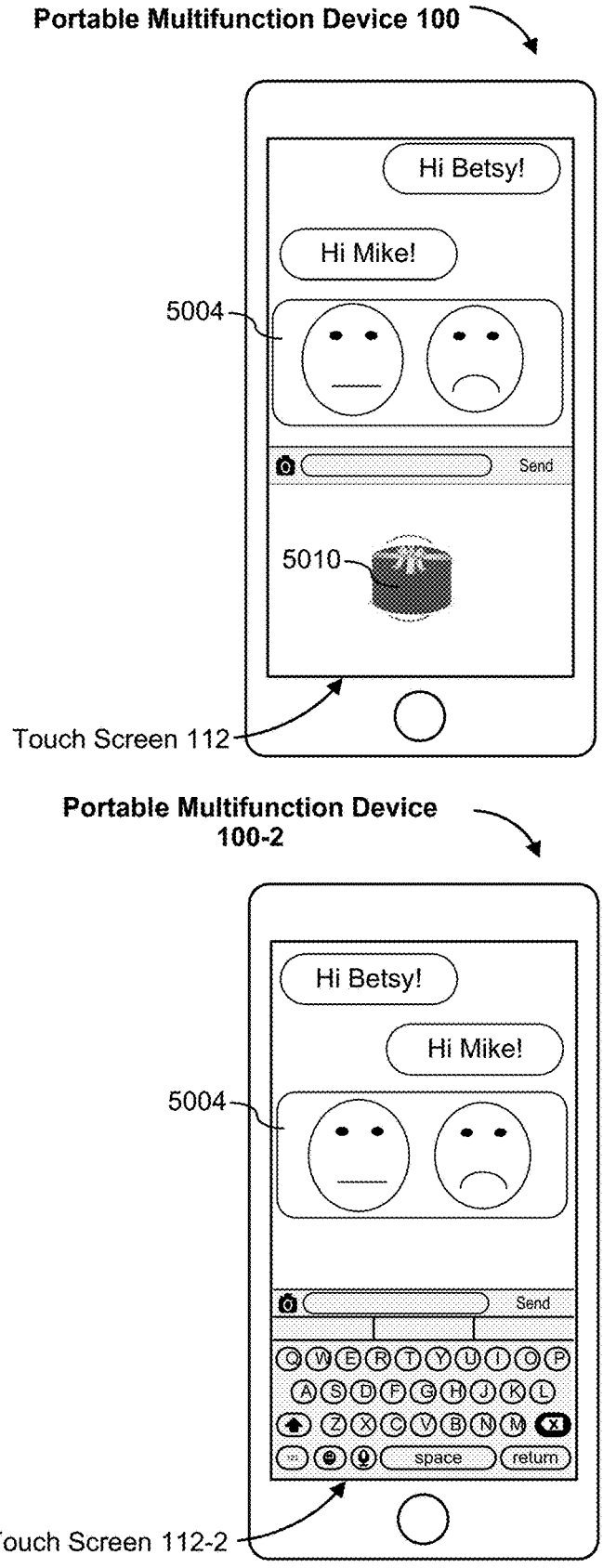

Portable Multifunction Device 100
Hi Betsy!
Hi Mike!
5004
Send
5010
Touch Screen 112
Portable Multifunction Device 100-2
Hi Betsy!
Hi Mike!
5004
Send
space
return
Touch Screen 112-2

Figure 50E

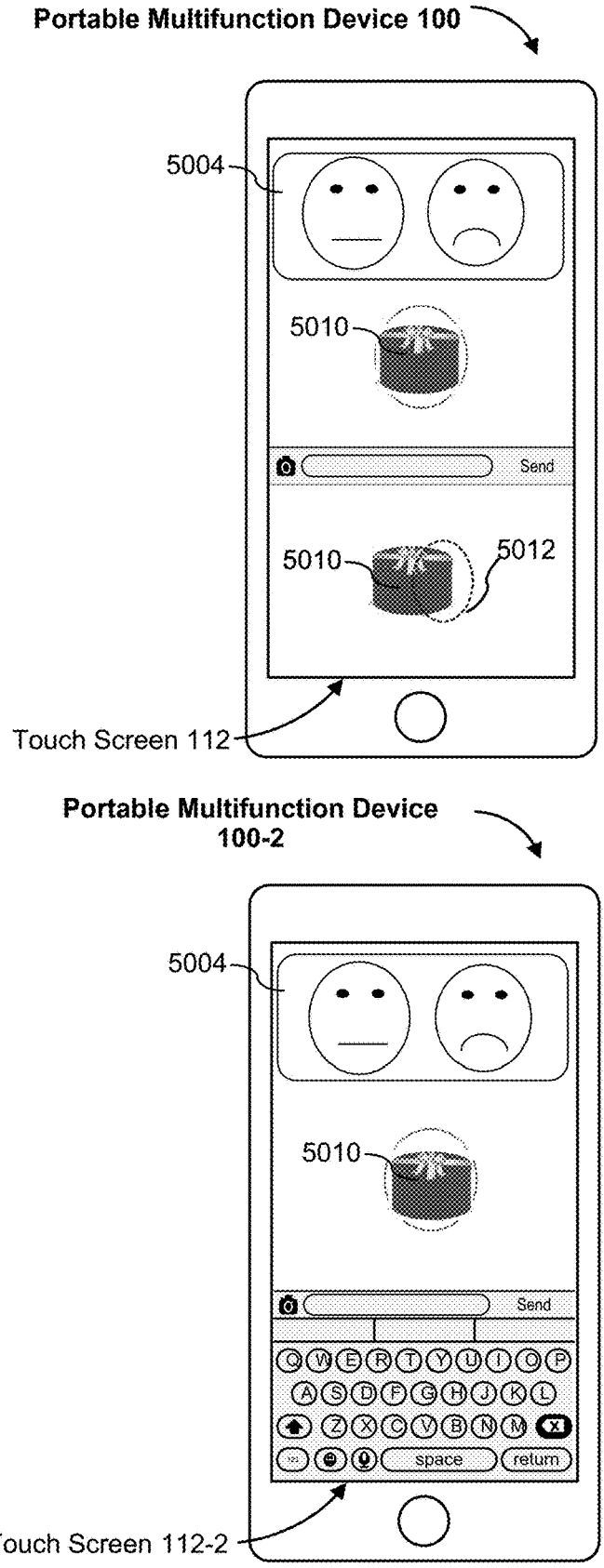

Portable Multifunction Device 100
5004
5010
Send
5010
5012
Touch Screen 112
Portable Multifunction Device 100-2
5004
5010
Send
space
return
Touch Screen 112-2

Figure 50F

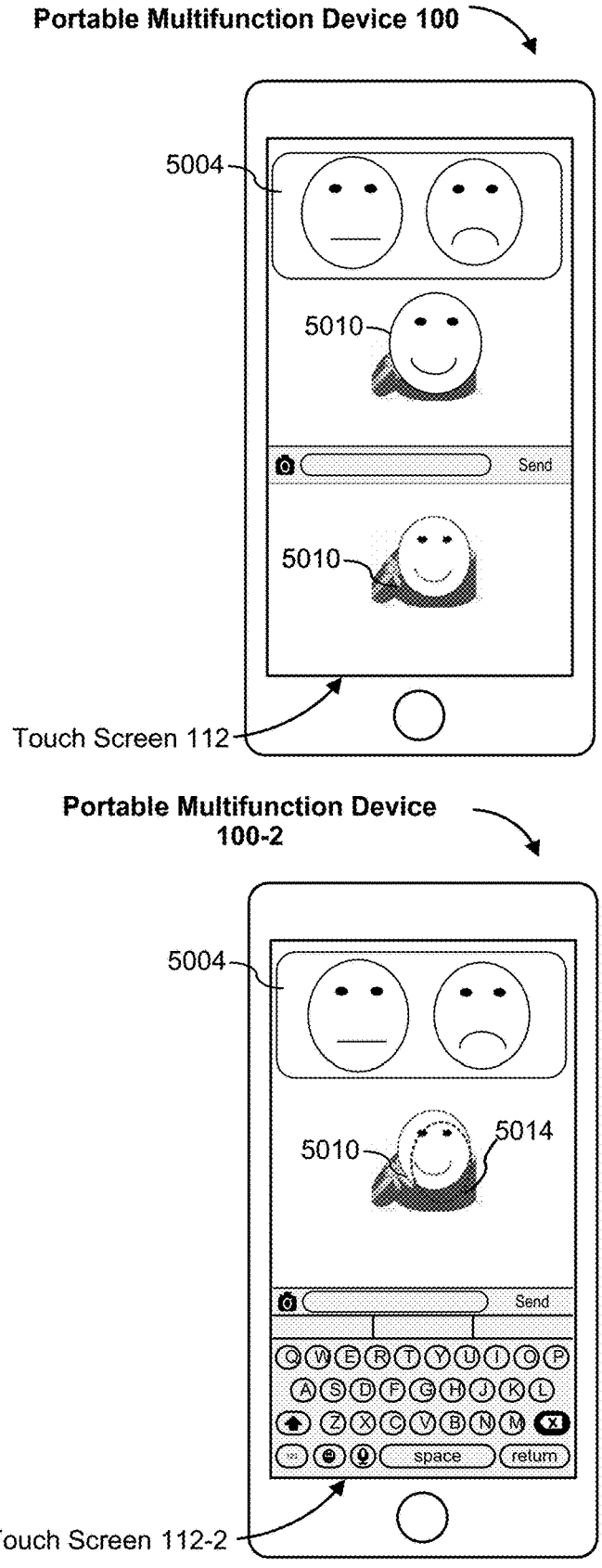

Portable Multifunction Device 100
5004
5010
Send
5010
Touch Screen 112
Portable Multifunction Device 100-2
5004
5010
5014
Send
space
return
Touch Screen 112-2

Figure 50G

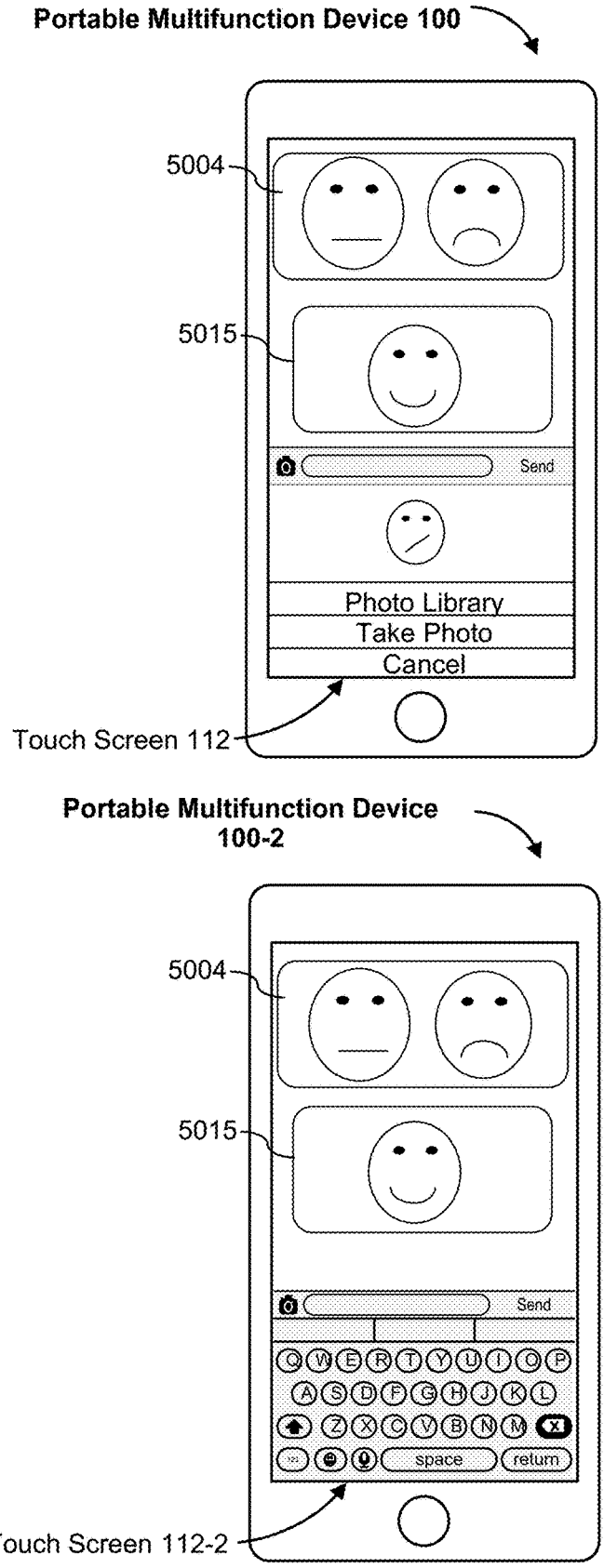

Portable Multifunction Device 100
5004
5015
Send
Photo Library
Take Photo
Cancel
Touch Screen 112
Portable Multifunction Device 100-2
5004
5015
Send
space
return
Touch Screen 112-2

Figure 50H

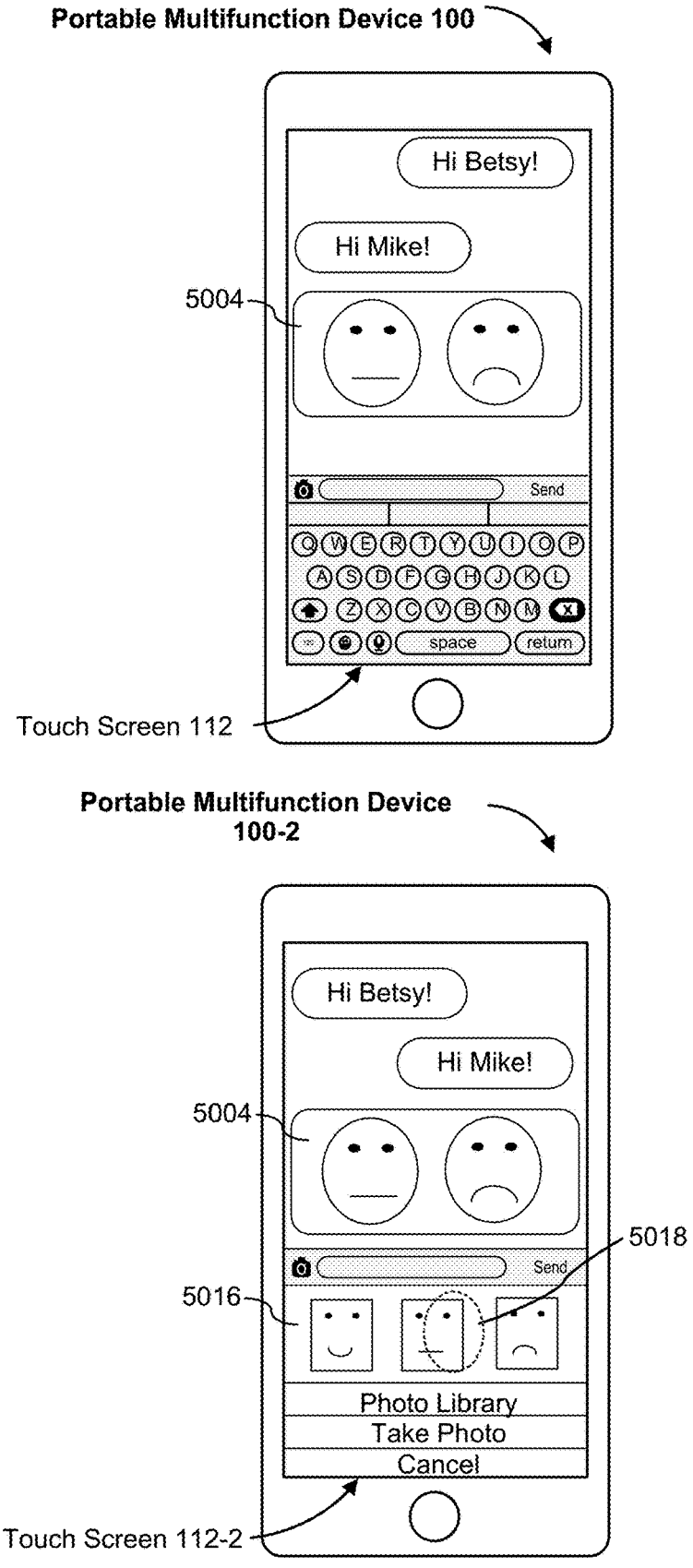

Portable Multifunction Device 100
Hi Betsy!
Hi Mike!
5004
Send
space
return
Touch Screen 112
Portable Multifunction Device 100-2
Hi Betsy!
Hi Mike!
5004
5018
Send
5016
Photo Library
Take Photo
Cancel
Touch Screen 112-2

Figure 50I

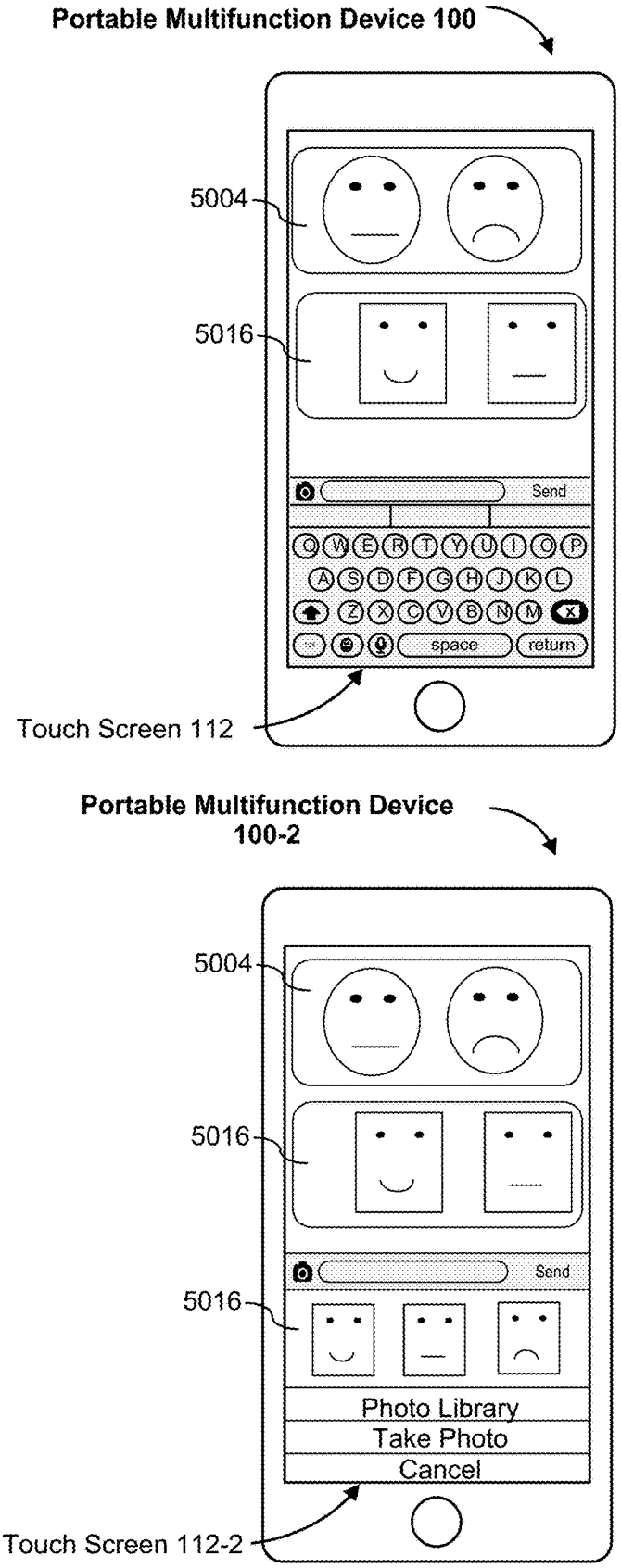

Portable Multifunction Device 100
5004
5016
Send
space
return
Touch Screen 112
Portable Multifunction Device 100-2
5004
5016
5016
Send
Photo Library
Take Photo
Cancel
Touch Screen 112-2

Figure 50J

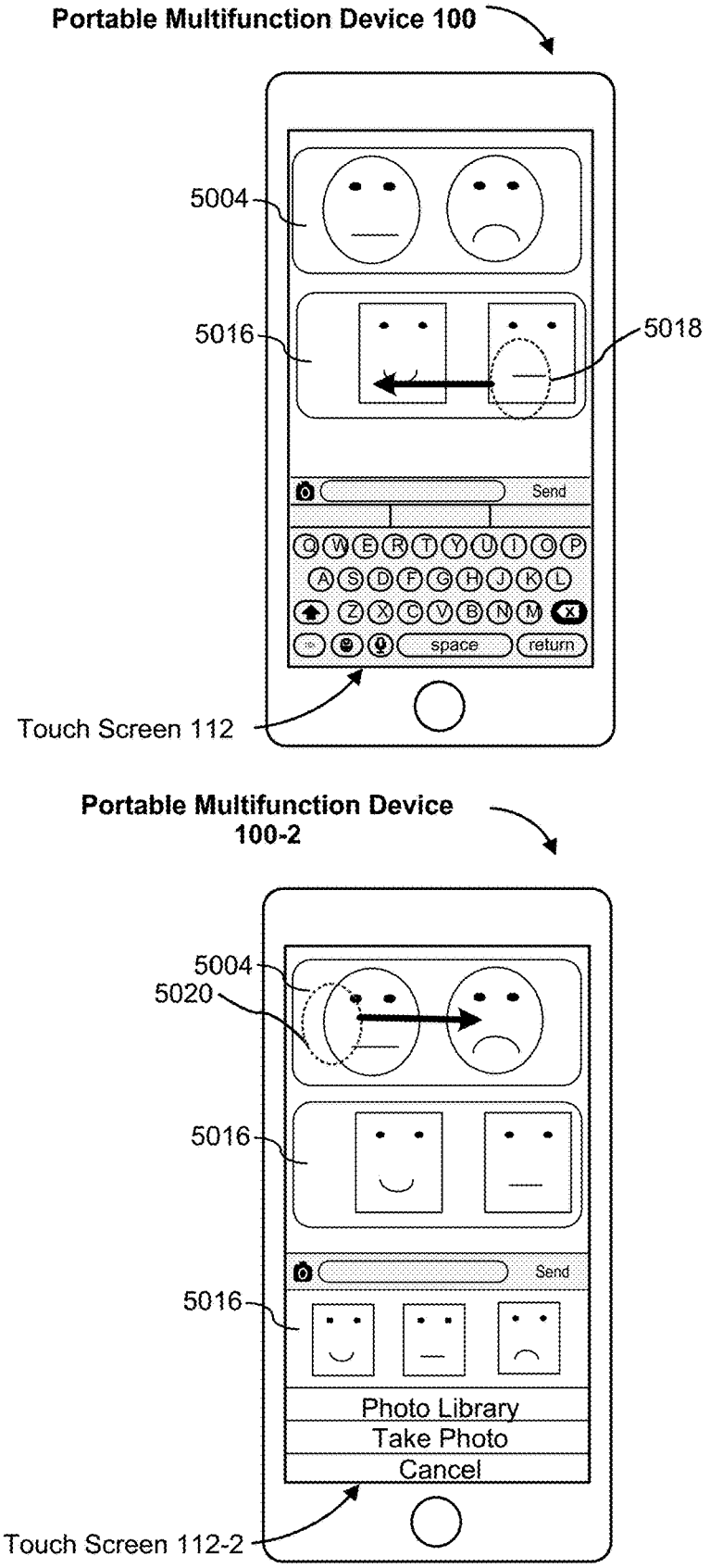

Portable Multifunction Device 100
5004
5016
5018
Send
space
return
Touch Screen 112
Portable Multifunction Device 100-2
5004
5020
5016
5016
Send
Photo Library
Take Photo
Cancel
Touch Screen 112-2

Figure 50K

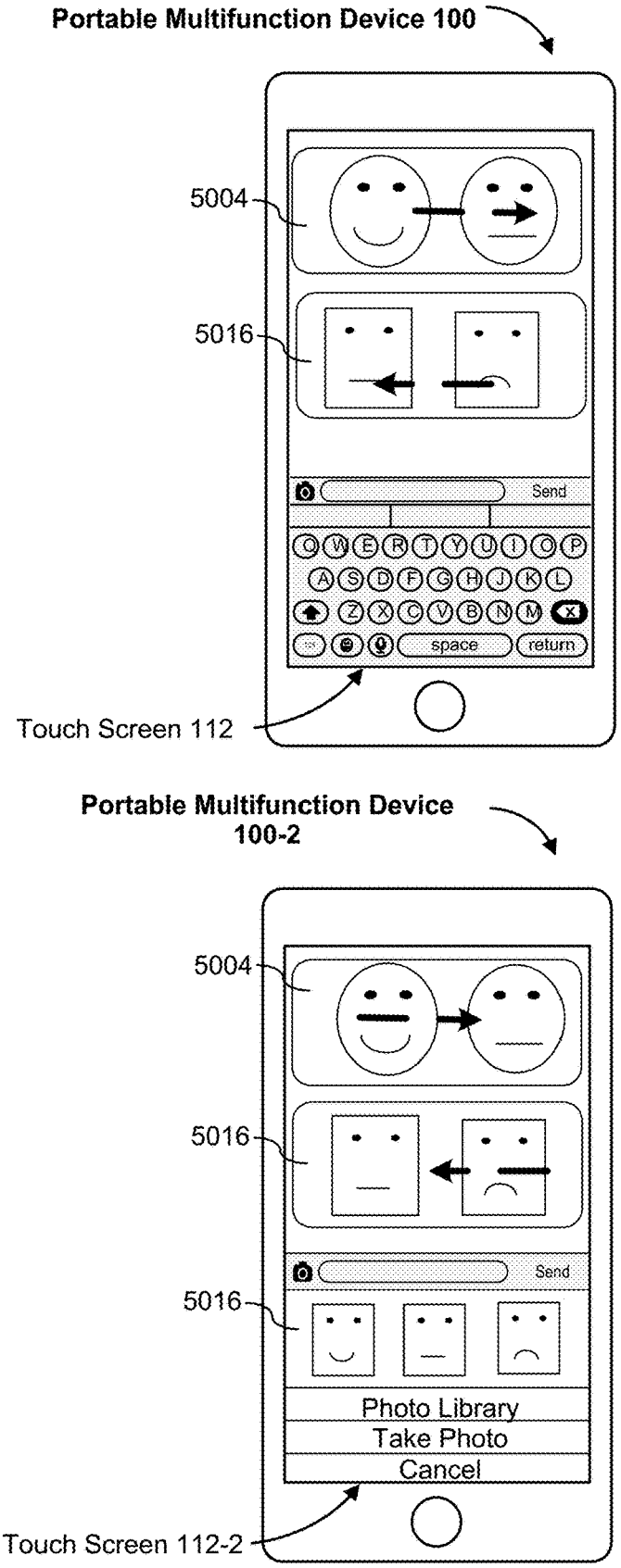

Portable Multifunction Device 100
5004
5016
Send
space
return
Touch Screen 112
Portable Multifunction Device 100-2
5004
5016
5016
Send
Photo Library
Take Photo
Cancel
Touch Screen 112-2

Figure 50L

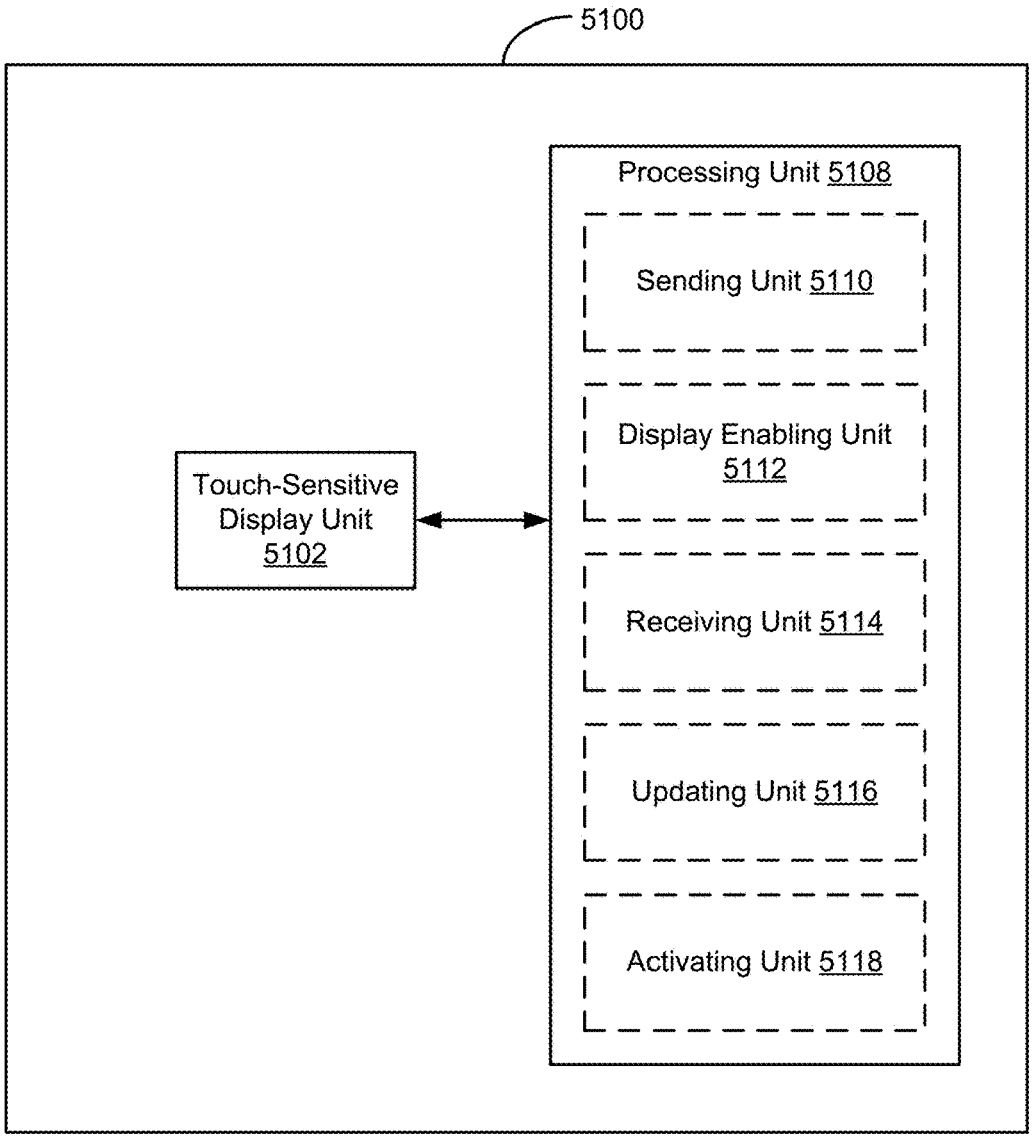

5100
Processing Unit 5108
Sending Unit 5110
Display Enabling Unit 5112
Touch-Sensitive Display Unit 5102
Receiving Unit 5114
Updating Unit 5116
Activating Unit 5118

Figure 51

PORTABLE COMPUTING INPUT DEVICES AND METHODS

RELATED APPLICATIONS

[0001] This application is a continuation of U.S. patent application Ser. No. 15/710,761, filed Sep. 20, 2017, which claims priority to U.S. Provisional Application Ser. No. 62/505,778, filed May 12, 2017, which are incorporated by reference herein in their entirety.

TECHNICAL FIELD

[0002] This disclosure relates generally to portable computing systems, and in particular to improved input devices and methods for portable computing systems.

BACKGROUND

[0003] While there have been major improvements made to portable computing devices, the size of the physical or virtual keyboard remains an issue. For example, virtual keyboards displayed on touch-screens of portable computing devices are small and difficult to interact with. Moreover, the size of physical keyboards for portable computing devices, like laptops, are limited by the size of the portable computing devices themselves. For example, a laptop computer keyboard cannot be any larger than the laptop computer's housing, which is oftentimes small. Also, some users of touch-screen portable computing devices use protective cases that include a physical keyboard that is the same or smaller than the size of the case. Due to the space constraints described above, these smaller keyboards typically include fewer keys. As such, it is desirable to provide an I/O device and input method, for portable computing devices that addresses the shortcomings of conventional keyboards and their associated input methods.

SUMMARY

[0004] Accordingly, there is a need for an improved keyboard and input method for portable computing devices that introduces new multi-functional keys to replace less frequently used keys found on conventional full-size keyboards. In some embodiments, the improved keyboard is a physical keyboard that includes sensors, such as touch sensors, contact intensity sensors, and/or microphones. Such methods and systems optionally complement or replace conventional methods and systems for receiving key inputs. The methods and systems in accordance with embodiments described herein not only require fewer keys, but also reduce the cognitive burden on a user and produce a more efficient human-machine interface. For battery-operated devices, a more efficient input mechanism also requires less computing resources, thereby increasing the battery life of the device.

[0005] The above deficiencies and other problems associated with user inputs for portable multifunction devices with touch-sensitive surfaces are reduced or eliminated by the disclosed devices. In some embodiments, the portable multifunction device is, e.g., a notebook computer, tablet computer, or handheld device. In some embodiments, the portable multifunction device is a personal electronic device (e.g., a wearable electronic device, such as a watch). In some embodiments, the device has a touchpad. In some embodiments, the device has a touch-sensitive display (also known as a "touch screen" or "touch-screen display"). In some embodiments, the device has one or more processors, memory and one or more modules, programs or sets of instructions stored in the memory for performing multiple functions including generating one or more graphical user interfaces (GUIs). In some embodiments, the user interacts with the GUI primarily through stylus and/or finger contacts and gestures on the touch-sensitive surface. In some embodiments, the functions optionally include image editing, drawing, presenting, word processing, spreadsheet making, game playing, telephoning, video conferencing, e-mailing, instant messaging, workout support, digital photographing, digital videoing, web browsing, digital music playing, note taking, and/or digital video playing. Executable instructions for performing these functions are, optionally, included in a non-transitory computer readable storage medium or other computer program product configured for execution by one or more processors.

[0006] In accordance with some embodiments, a method of punctuation character entry is performed at a portable multifunction device comprising one or more processors, memory, and a touch-sensitive display. The method includes: providing a key on which is depicted at least one pair of open and close punctuation characters; displaying editable content on the display; detecting a first input selecting the key; and in response to detecting the first input selecting the key, determining whether to insert an open or a close punctuation character. In accordance with a determination to insert an open punctuation character, the method includes displaying in the editable content the open punctuation character of the at least one pair of open and close punctuation characters, displaying an insertion marker after the open punctuation character, and displaying a close punctuation character adjacent the insertion marker opposite to the open punctuation character. In accordance with a determination to insert the close punctuation character, the method includes displaying the close punctuation character in the editable content on the display.

[0007] In accordance with some embodiments, a portable multifunction device is provided that includes a touch-sensitive display unit configured to display editable content and to detect contacts; and a processing unit coupled with the touch-sensitive display unit. The processing unit is configured to: provide a key on which is depicted at least one pair of open and close punctuation characters; display editable content on the touch-sensitive display unit; detect a first input selecting the key; and in response to detecting the first input selecting the key, determine whether to insert an open or a close punctuation character. The processing unit is further configured to, in accordance with a determination to insert an open punctuation character, display in the editable content the open punctuation character of the at least one pair of open and close punctuation characters, display an insertion marker after the open punctuation character, and display a close punctuation character adjacent the insertion marker opposite to the open punctuation character. The processing unit is further configured to, in accordance with a determination to insert the close punctuation character, display the close punctuation character in the editable content on the display.

[0008] In accordance with some embodiments, a method of character entry is performed at a portable multifunction device comprising one or more processors, memory, a touch screen display, and a physical keyboard removably coupled to the portable multifunction device. The method includes: detecting an input on a key of the physical keyboard;

determining if the input is of a first type or a second type distinct from the first type; upon determining that the input is of the first type, displaying a first set of characters associated with the key for selection; and upon determining that the input is of the second type, displaying a second set of characters associated with the key for selection.

[0009] In accordance with some embodiments, a portable multifunction device is provided that includes a touch screen display unit configured to receive touch inputs and display user interfaces; a physical keyboard unit removably coupled to the portable multifunction device; and a processing unit coupled with the touch screen display and the physical keyboard unit. The processing unit is configured to: detect an input on a key of the physical keyboard unit; determine if the input is of a first type or a second type distinct from the first type; upon determining that the input is of the first type, enable display of a first set of characters associated with the key for selection; and upon determining that the input is of the second type, enable display of a second set of characters associated with the key for selection.

[0010] In accordance with some embodiments, a method for processing a currency entry is performed at a portable multifunction device comprising one or more processors, memory, a display, and a physical keyboard removably coupled to the portable multifunction device. The physical keyboard contains at least one sensor for detecting contact intensities of inputs on keys of the physical keyboard. The method includes: detecting an input on a dedicated currency key of the physical keyboard; in response to receiving the input, determining if the input is of a first type or a different second type; upon determining that the input is of the first type, inserting a currency symbol based on a location of the portable multifunction device; and upon determining that the input is of the second type, displaying a set of different currency characters on the display for selection, wherein upon a selection of a currency character in the set of different currency characters, a numerical value associated with a first currency displayed on the display is converted from the first currency to a second currency corresponding to the selected currency character.

[0011] In accordance with some embodiments, a portable multifunction device for processing a currency entry is provided that includes a display unit configured to display user interfaces; a physical keyboard unit removably coupled to the portable multifunction device, where the physical keyboard unit contains at least one sensor unit for detecting contact intensities of inputs on keys of the physical keyboard unit; and a processing unit coupled with the display unit, and the physical keyboard unit. The processing unit is configured to: detect an input on a dedicated currency key of the physical keyboard unit; in response to receiving the input, determine if the input is of a first type or a different second type; upon determining that the input is of the first type, insert a currency symbol based on a location of the portable multifunction device; and upon determining that the input is of the second type, enable display of a set of different currency characters on the display for selection, where upon a selection of a currency character in the set of different currency characters, a numerical value associated with a first currency displayed on the display is converted from the first currency to a second currency corresponding to the selected currency character.

[0012] In accordance with some embodiments, a method for processing contact details entry is performed at a portable multifunction device comprising one or more processors, memory, a display, and a physical keyboard removably coupled to the portable multifunction device. The method includes: displaying at least a portion of text on the display; detecting an input on a dedicated contacts key of the physical keyboard; in response to detecting the input, automatically suggesting one or more contact details based on the portion of text; receiving a selection of a contact detail of the one or more contact details; and displaying the contact detail on the display.

[0013] In accordance with some embodiments, a portable multifunction device for processing contact details entry is provided that includes a display unit configured to display user interfaces; a physical keyboard unit removably coupled to the portable multifunction device; and a processing unit coupled with the display unit, and the physical keyboard unit. The processing unit is configured to: enable display of at least a portion of text on the display unit; detect an input on a dedicated contacts key of the physical keyboard unit; in response to detecting the input, automatically suggest one or more contact details based on the portion of text; receive a selection of a contact detail of the one or more contact details; and enable display of the contact detail on the display unit.

[0014] In accordance with some embodiments, a method for switching between active windows is performed at a portable multifunction device comprising one or more processors, memory, a display, and a physical keyboard removably coupled to the portable multifunction device. The physical keyboard contains at least one sensor for detecting contact intensities of inputs on keys of the physical keyboard. The method includes: displaying a user interface for an open application on the display; detecting an input on a dedicated home key of the physical keyboard; in response to detecting the input, determining whether the input is of a first type or a second type; in accordance with a determination that the input is the first type, displaying a home screen on the display; and in accordance with a determination that the input is the second type, displaying a navigable list of concurrently open applications including the open application on the portable multifunction device.

[0015] In accordance with some embodiments, a portable multifunction device for processing contact details entry is provided that includes a display unit configured to display user interfaces; a physical keyboard unit removably coupled to the portable multifunction device; and a processing unit coupled with the display unit, and the physical keyboard unit. The processing unit is configured to: enable display of at least a portion of text on the display unit; detect an input on a dedicated contacts key of the physical keyboard unit; in response to detecting the input, automatically suggest one or more contact details based on the portion of text; receive a selection of a contact detail of the one or more contact details; and enable display of the contact detail on the display unit.

[0016] In accordance with some embodiments, a method for selecting content is performed at a portable multifunction device comprising one or more processors, memory, a display, and a physical keyboard removably coupled to the portable multifunction device. The method includes: displaying content of an electronic document on the display; displaying a cursor within the electronic document; detecting an input on a dedicated select key of the physical keyboard; and in response to detecting the input: selecting a

portion of the content in the document closest to the cursor; and displaying the portion of the content as selected content on the display.

[0017] In accordance with some embodiments, a portable multifunction device for selecting content is provided that includes a display unit configured to display user interfaces; a physical keyboard unit removably coupled to the portable multifunction device; and a processing unit coupled with the display unit and the physical keyboard unit. The processing unit is configured to: enable display of content of an electronic document on the display unit; enable display of a cursor within the electronic document; detect an input on a dedicated select key of the physical keyboard unit; and in response to detecting the input: select a portion of the content in the document closest to the cursor; and enable display of the portion of the content as selected content on the display unit.

[0018] In accordance with some embodiments, a method of tabbing is performed at a portable multifunction device comprising one or more processors, memory, a display, and a physical keyboard removably coupled to the portable multifunction device. The method includes: detecting an input on a dedicated tab key of the physical keyboard; in response to detecting the input, determining whether the portable multifunction device is in an editing mode to edit content; in accordance with a determination that the portable multifunction device is not in an editing mode: identifying an active window of the portable multifunction device and an active pane in the active window; and switching to a pane of the active window different from the active pane; and in accordance with a determination that the portable multifunction device is in an editing mode, displaying a list of suggested words for selection to be inserted into the content.

[0019] In accordance with some embodiments, a portable multifunction device for tabbing is provided that includes a display unit configured to display user interfaces; a physical keyboard unit removably coupled to the portable multifunction device; and a processing unit coupled with the display unit and the physical keyboard unit. The processing unit is configured to: detect an input on a dedicated tab key of the physical keyboard unit; in response to detecting the input, determine whether the portable multifunction device is in an editing mode to edit content; in accordance with a determination that the portable multifunction device is not in an editing mode: identify an active window of the portable multifunction device and an active pane in the active window; and switch to a pane of the active window different from the active pane; and in accordance with a determination that the portable multifunction device is in an editing mode, enable display of a list of suggested words for selection to be inserted into the content.

[0020] In accordance with some embodiments, a method for inserting or sharing content is performed at a portable multifunction device comprising one or more processors, memory, a display, and a physical keyboard removably coupled to the portable multifunction device. The method includes: displaying content on the display; detecting an input on a dedicated share key of the physical keyboard; in response to detecting the input, determining whether the content is editable; in accordance with a determination that the content is editable, displaying an insert menu through which a user can insert content into the content; and in accordance with a determination that the content is not editable, displaying a share menu through which a user can share a portion of the content.

[0021] In accordance with some embodiments, a portable multifunction device for inserting or sharing content is provided that includes a display unit configured to display user interfaces; a physical keyboard unit removably coupled to the portable multifunction device; and a processing unit coupled with the display unit and the physical keyboard unit. The processing unit is configured to: enable display of content on the display unit; detect an input on a dedicated share key of the physical keyboard unit; in response to detecting the input, determine whether the content is editable; in accordance with a determination that the content is editable, enable display of an insert menu through which a user can insert content into the content; and in accordance with a determination that the content is not editable, enable display of a share menu through which a user can share a portion of the content.

[0022] In accordance with some embodiments, a method for providing a notification to a user is performed at a portable multifunction device comprising one or more processors, memory, a display, and a physical keyboard removably coupled to the portable multifunction device. The physical keyboard contains at least one sensor for detecting contact intensities of inputs on keys of the physical keyboard. The method includes: detecting an input on a dedicated notification key of the physical keyboard; determining if the input is of a first type or a different second type; upon determining that the input is of the first type: determining whether a new notification is available; upon determining that the new notification is available, activating an application associated with the new notification to view the notification; upon determining that no new notification is available, displaying a notification center; and upon determining that the input is of the second type: displaying the notification center on the display; and ceasing to display the notification center upon a release of the notification key.

[0023] In accordance with some embodiments, a portable multifunction device for providing a notification to a user is provided that includes a display unit configured to display user interfaces; a physical keyboard unit removably coupled to the portable multifunction device, wherein the physical keyboard unit contains at least one sensor for detecting contact intensities of inputs on keys of the physical keyboard unit; and a processing unit coupled with the display unit and the physical keyboard unit. The processing unit is configured to: detect an input on a dedicated notification key of the physical keyboard unit; determine if the input is of a first type or a different second type; upon determining that the input is of the first type: determine whether a new notification is available; upon determining that the new notification is available, activate an application associated with the new notification to view the new notification; upon determining that no new notification is available, enable display of a notification center; and upon determining that the input is of the second type: enable display of the notification center on the display unit; and cease to display the notification center upon a release of the notification key.

[0024] In accordance with some embodiments, a detachable keyboard with one or more touch-sensitive input strips, comprising: a housing having top, bottom, left, and right sides; a plurality of physical keys arranged in a key area at least partially within the housing; at least one connector disposed at the top side of the housing to connect the

detachable keyboard to a touch screen device; and at least one elongate touch-sensitive strip disposed at the bottom, left, or right side of the housing, where a length of the touch-sensitive strip extends across a majority of its respective side of the housing.

[0025] In accordance with some embodiments, a detachable keyboard with one or more touch sensitive strips is provided that includes a housing unit having top, bottom, left, and right sides; a plurality of physical keys arranged in a key area unit at least partially within the housing unit; at least one connector unit disposed at the top side of the housing to connect the detachable keyboard to a touch screen device; and at least one elongate touch sensitive strip unit disposed at the bottom, left, or right side of the housing, where a length of the touch sensitive strip unit extends across a majority of its respective side of the housing unit.

[0026] In accordance with some embodiments, a method for scrolling through content is performed at a portable multifunction device comprising one or more processors, memory, a touch screen display, and a physical keyboard removably coupled to the portable multifunction device. The method includes: displaying content on the touch screen display; detecting an input of an arrow key located on the physical keyboard, wherein one or more contact intensity sensors are coupled to the arrow key for detecting contact intensities of inputs on the arrow key; in response to detecting the input, determining whether the input is of a first type or a second type different from the first type; upon determining that the input is of the first type: scrolling the content on the display at a first speed faster than a normal scrolling speed; detecting a continued contact with the arrow key; and in response to detecting the continued contact with the arrow key, maintaining the first speed of the scrolling faster than the normal scrolling speed; and upon determining that the input is of the second type: determining a contact intensity of the input; and scrolling the content on the display at a second speed determined based on the contact intensity of the input.

[0027] In accordance with some embodiments, a portable multifunction device for scrolling through content is provided that includes a touch screen display unit configured to display user interfaces and to detect touch inputs; a physical keyboard unit removably coupled to the portable multifunction device; and a processing unit coupled with the touch screen display unit and the physical keyboard unit. The processing unit is configured to: enable display of content on the touch screen display unit; detect an input of an arrow key located on the physical keyboard unit, wherein one or more contact intensity sensors are coupled to the arrow key for detecting contact intensities of inputs on the arrow key; in response to detecting the input, determine whether the input is of a first type or a second type different from the first type; upon determining that the input is of the first type: scroll the content on the touch screen display unit at a first speed faster than a normal scrolling speed; detect a continued contact with the arrow key; and in response to detecting the continued contact with the arrow key, maintain the first speed of the scrolling faster than the normal scrolling speed; and upon determining that the input is of the second type: determine a contact intensity of the input; and scroll the content on the touch screen display unit at a second speed determined based on the contact intensity of the input.

[0028] In accordance with some embodiments, a method of inchworm scrolling is performed at a portable multifunction device comprising one or more processors, memory, a display, and a physical keyboard removably coupled to the portable multifunction device. The method includes: displaying content of an electronic document on the display, the content includes a first portion displayed at a first location and a second portion displayed at a second location adjacent to the first location; detecting an input on an arrow key located on the keyboard; in response to detecting the input: moving the first portion to a third location in a direction associated with the arrow key, while maintaining the second portion stationary at the second location; and subsequent to moving the first portion, moving the second portion to a fourth location in a direction associated with the arrow key, while maintaining the first portion stationary at the third location.

[0029] In accordance with some embodiments, a portable multifunction device for inchworm scrolling is provided that includes a display unit configured to display user interfaces; a physical keyboard unit removably coupled to the portable multifunction device; and a processing unit coupled with the display unit and the physical keyboard unit. The processing unit is configured to: enable display of content of an electronic document on the display unit, the content includes a first portion displayed at a first location and a second portion displayed at a second location adjacent to the first location; detect an input on an arrow key located on the keyboard; in response to detecting the input: move the first portion to a third location in a direction associated with the arrow key, while maintaining the second portion stationary at the second location; and subsequent to moving the first portion, move the second portion to a fourth location in a direction associated with the arrow key, while maintaining the first portion stationary at the third location.

[0030] In accordance with some embodiments, a method for switching between virtual keyboards is performed at an electronic device including one or more processors, memory, and a touch-sensitive display. The method includes: displaying a first virtual keyboard of a first size on the display; in response to detecting a pre-defined gesture on the display, concurrently displaying multiple keyboards, including the first keyboard reduced to a second size smaller than the first size; detecting a selection of one of the multiple keyboards; ceasing to display the multiple keyboards; and displaying the selected one of the multiple keyboards on the display at the first size.

[0031] In accordance with some embodiments, an electronic device is provided that includes a touch-sensitive display unit configured to receive user inputs and display user interfaces and a processing unit coupled to the touch-sensitive display unit. The processing unit is configured to: enable display of a first virtual keyboard of a first size on the display unit; in response to detecting a pre-defined gesture on the display unit, concurrently enable display of multiple keyboards, including the first keyboard reduced to a second size smaller than the first size; detect a selection of one of the multiple keyboards; cease to display the multiple keyboards; and enable display of the selected one of the multiple keyboards on the display unit at the first size.

[0032] In accordance with some embodiments, a method for switching between lower and upper case characters is performed at an electronic device including one or more **11** processors, memory, and a touch-sensitive display. The method includes: displaying on the display a virtual keyboard without a shift key, wherein keys on the keyboard

have a first appearance; detecting a contact at a location on the virtual keyboard followed by a movement of the contact in a direction; and in response to detecting the contact at the location on the virtual keyboard followed by the movement of the contact in the direction, changing the appearance of the keys on the keyboard to a second appearance different from the first appearance.

[0033] In accordance with some embodiments, an electronic device is provided that includes a touch-sensitive display unit configured to receive user inputs and display user interfaces and a processing unit coupled to the touch-sensitive display unit. The processing unit is configured to: enable display of on the display unit a virtual keyboard without a shift key, wherein keys on the keyboard have a first appearance; detect a contact at a location on the virtual keyboard followed by a movement of the contact in a direction; and in response to detecting the contact at the location on the virtual keyboard followed by the movement of the contact in the direction, change the appearance of the keys on the keyboard to a second appearance different from the first appearance.

[0034] In accordance with some embodiments, a method for communicating between users is performed at an electronic device including one or more processors, memory, and a touch-sensitive display. The method includes: displaying a user interface of an instant messenger application on the display; analyzing an instant message displayed in the user interface of the instant messenger application to identify a user's intention to perform an action associated with an application different from the instant messenger application; upon determining an intention to perform the action, displaying an affordance to perform the action in the user interface of the instant messenger application; while displaying the affordance in the user interface of the instant messenger application, detecting a user input on the affordance in the user interface of the instant messenger application; and in response to detecting the user input, facilitating the action.

[0035] In accordance with some embodiments, an electronic device is provided that includes a touch-sensitive display unit configured to receive user inputs and display user interfaces and a processing unit coupled to the touch-sensitive display unit. The processing unit is configured to: enable display of a user interface of an instant messenger application on the display unit; analyze an instant message displayed in the user interface of the instant messenger application to identify a user's intention to perform an action associated with an application different from the instant messenger application; upon determining an intention to perform the action, enable display of an affordance to perform the action in the user interface of the instant messenger application; while enabling display of the affordance in the user interface of the instant messenger application, detect a user input on the affordance in the user interface of the instant messenger application; and in response to detecting the user input, facilitate the action.

[0036] In accordance with some embodiments, a method for mirrored control between devices is performed at a first electronic device including one or more processors, memory, and a touch-sensitive display. The method includes: sending an item from a first instant messenger application running on the first electronic device to a second instant messenger application running on a second electronic device; displaying the item in the first instant messenger application, wherein the item is concurrently displayed in the second instant messenger application; receiving information corresponding to an interaction with the item; and in response to receiving information corresponding to the interaction, updating the item on the first electronic device, wherein the update to the item is mirrored on the second electronic device.

[0037] In accordance with some embodiments, a first electronic device is provided that includes a touch-sensitive display unit configured to receive user inputs and display user interfaces and a processing unit coupled to the touch-sensitive display unit. The processing unit is configured to: send an item from a first instant messenger application running on the first electronic device to a second instant messenger application running on a second electronic device; enable display of the item in the first instant messenger application, wherein the item is concurrently displayed in the second instant messenger application; receive information corresponding to an interaction with the item; and in response to receiving information corresponding to the interaction, update the item on the first electronic device, wherein the update to the item is mirrored on the second electronic device.

[0038] In accordance with some embodiments, an electronic device includes a touch-sensitive display, optionally one or more sensors to detect intensities of contacts with the touch-sensitive display, one or more processors, memory, and one or more programs; the one or more programs are stored in the memory and configured to be executed by the one or more processors and the one or more programs include instructions for performing or causing performance of the operations of any of the methods described herein. In accordance with some embodiments, a computer readable storage medium has stored therein instructions which when executed by an electronic device with a touch-sensitive display, and optionally one or more sensors to detect intensities of contacts with the touch-sensitive display, cause the device to perform or cause performance of the operations of any of the methods described herein. In accordance with some embodiments, a graphical user interface on an electronic device with a touch-sensitive display, optionally one or more sensors to detect intensities of contacts with the touch-sensitive display, a memory, and one or more processors to execute one or more programs stored in the memory includes one or more of the elements displayed in any of the methods described herein, which are updated in response to inputs, as described in any of the methods described herein. In accordance with some embodiments, an electronic device includes: a touch-sensitive display, and optionally one or more sensors to detect intensities of contacts with the touch-sensitive display; and means for performing or causing performance of the operations of any of the methods described herein. In accordance with some embodiments, an information processing apparatus, for use in an electronic device with a touch-sensitive display, and optionally one or more sensors to detect intensities of contacts with the touch-sensitive display, includes means for performing or causing performance of the operations of any of the methods described herein.

[0039] Thus, portable multifunction devices with touch-sensitive displays are provided with faster, more efficient input devices, methods and interfaces, thereby increasing the effectiveness, efficiency, and user satisfaction with such

devices. Such methods and interfaces may complement or replace conventional input methods and systems.

BRIEF DESCRIPTION OF THE DRAWINGS

[0040] For a better understanding of the various described embodiments, reference should be made to the Description of Embodiments below, in conjunction with the following drawings in which like reference numerals refer to corresponding parts throughout the figures.

[0041] FIG. **1**A is a block diagram illustrating a portable multifunction device with a touch-sensitive display in accordance with some embodiments.

[0042] FIG. **1**B is a block diagram illustrating exemplary components for event handling, in accordance with some embodiments.

[0043] FIG. **2**A is a schematic diagram of a portable multifunction device having a touch screen, in accordance with some embodiments.

[0044] FIG. **2**B illustrates an exemplary user interface for a multifunction device with a touch-sensitive surface that is separate from the display in accordance with some embodiments.

[0045] FIG. **3**A is a schematic diagram of a user interface for a menu of applications on a portable multifunction device, in accordance with some embodiments.

[0046] FIG. **3**B is an illustrative diagram of a portable computing system, in accordance with some embodiments.

[0047] FIGS. **4**A-**4**C are flow charts illustrating a method of punctuation character entry, in accordance with some embodiments.

[0048] FIGS. **5**A-**5**J illustrate exemplary user interfaces for punctuation character entry, in accordance with some embodiments.

[0049] FIG. **6** is a functional block diagram of an electronic device, in accordance with some embodiments.

[0050] FIG. **7** is a flow chart illustrating a method of character entry, in accordance with some embodiments.

[0051] FIGS. **8**A-**8**F illustrate exemplary user interfaces for emoji and punctuation character entry, in accordance with some embodiments.

[0052] FIG. **9** is a functional block diagram of an electronic device, in accordance with some embodiments.

[0053] FIGS. **10**A-**10**B are flow charts illustrating a method of currency character entry, in accordance with some embodiments.

[0054] FIGS. **11**A-**11**H illustrate exemplary user interfaces for currency character entry, in accordance with some embodiments.

[0055] FIG. **12** is a functional block diagram of an electronic device, in accordance with some embodiments.

[0056] FIG. **13** is a flow chart illustrating a method of contact details entry, in accordance with some embodiments.

[0057] FIGS. **14**A-**14**E illustrate exemplary user interfaces for contact details entry, in accordance with some embodiments.

[0058] FIG. **15** is a functional block diagram of an electronic device, in accordance with some embodiments.

[0059] FIGS. **16**A-**16**B are flow charts illustrating a method of displaying home screen and multitasking screen, in accordance with some embodiments.

[0060] FIGS. **17**A-**17**E illustrate exemplary user interfaces for a home screen and a multitasking screen, in accordance with some embodiments.

[0061] FIG. **18** is a functional block diagram of an electronic device, in accordance with some embodiments.

[0062] FIG. **19** is a flow chart illustrating a method of content selection using a dedicated select key on a physical keyboard, in accordance with some embodiments.

[0063] FIGS. **20**A-**20**C illustrate exemplary user interfaces for content selection, in accordance with some embodiments.

[0064] FIG. **21** is a functional block diagram of an electronic device, in accordance with some embodiments.

[0065] FIG. **22** is a flow chart illustrating a method of using a multifunction tab key, in accordance with some embodiments.

[0066] FIGS. **23**A-**23**C illustrate exemplary user interfaces using a multifunction tab key, in accordance with some embodiments.

[0067] FIG. **24** is a functional block diagram of an electronic device, in accordance with some embodiments.

[0068] FIG. **25** is a flow chart illustrating a method of content sharing and insertion using a dedicated share key, in accordance with some embodiments.

[0069] FIGS. **26**A-**26**B illustrate exemplary user interfaces for content sharing and insertion using a dedicated share key, in accordance with some embodiments.

[0070] FIG. **27** is a functional block diagram of an electronic device, in accordance with some embodiments.

[0071] FIG. **28** is a flow chart illustrating a method of providing notification using a dedicated notification key, in accordance with some embodiments.

[0072] FIGS. **29**A-**29**F illustrate exemplary user interfaces of using a dedicated notification key, in accordance with some embodiments.

[0073] FIG. **30** is a functional block diagram of an electronic device, in accordance with some embodiments.

[0074] FIGS. **31**A-**31**B are schematic diagrams of a detachable keyboard and a system comprising the detachable keyboard and a portable multifunction device, in accordance with some embodiments.

[0075] FIGS. **32**A-**32**L illustrate exemplary user interfaces on a portable multifunction device connecting to a detachable keyboard, in accordance with some embodiments.

[0076] FIG. **33** is a functional block diagram of an electronic device, in accordance with some embodiments.

[0077] FIGS. **34**A-**34**B are flow charts illustrating a method of arrow key scrolling, in accordance with some embodiments.

[0078] FIGS. **35**A-**35**H illustrate exemplary user interfaces of arrow key scrolling, in accordance with some embodiments.

[0079] FIG. **36** is a functional block diagram of an electronic device, in accordance with some embodiments.

[0080] FIG. **37** is a flow chart illustrating a method of text scrolling using an arrow key, in accordance with some embodiments.

[0081] FIGS. **38**A-**38**B illustrate exemplary user interfaces for text scrolling using an arrow key, in accordance with some embodiments.

[0082] FIG. **39** is a functional block diagram of an electronic device, in accordance with some embodiments.

[0083] FIG. **40** is a flow chart illustrating a method of keyboard switching, in accordance with some embodiments.

[0084] FIGS. **41**A-**41**N illustrate exemplary user interfaces of keyboard switching, in accordance with some embodiments.

[0085] FIG. **42** is a functional block diagram of an electronic device, in accordance with some embodiments.

[0086] FIG. **43** is a flow chart illustrating a method for switching between lower and upper case characters, in accordance with some embodiments.

[0087] FIGS. **44**A-**44**G illustrate exemplary user interfaces of switching between lower and upper case characters, in accordance with some embodiments.

[0088] FIG. **45** is a functional block diagram of an electronic device, in accordance with some embodiments.

[0089] FIGS. **46**A-**46**C are flow charts illustrating a method for communicating between users, in accordance with some embodiments.

[0090] FIGS. **47**A-**47**L illustrate exemplary user interfaces for communicating between users, in accordance with some embodiments.

[0091] FIG. **48** is a functional block diagram of an electronic device, in accordance with some embodiments.

[0092] FIGS. **49**A-**49**C are flow charts illustrating a method for mirrored control between devices, in accordance with some embodiments.

[0093] FIGS. **50**A-**50**L illustrate exemplary user interfaces for mirrored control between devices, in accordance with some embodiments.

[0094] FIG. **51** is a functional block diagram of an electronic device, in accordance with some embodiments.

DESCRIPTION OF EMBODIMENTS

[0095] The following describes systems and methods that allow a user to more efficiently use smaller keyboards typically used with portable computing devices. For example, some embodiments describe how users can efficiently enter punctuation characters in an electronic document using a keyboard with fewer keys than is typical on a full-sized keyboard. While the systems and methods described herein provide fewer keys on either a virtual or a physical keyboard, the fewer keys still allow a user to enter characters or perform actions traditionally available only when using full-size keyboards. Further, some of the keys have multiple functions, where in some embodiments, the system or keyboard automatically and without human intervention determines the function of the key based on the context. The improved keyboard also reduces the number of steps that a user must perform to locate and enter a character, thereby increasing efficiency and ease of use.

Exemplary Devices

[0096] Reference will now be made in detail to embodiments, examples of which are illustrated in the accompanying drawings. In the following detailed description, numerous specific details are set forth in order to provide a thorough understanding of the present invention. However, it will be apparent to one of ordinary skill in the art that the present invention may be practiced without these specific details. In other instances, well-known methods, procedures, components, circuits, and networks have not been described in detail so as not to unnecessarily obscure aspects of the embodiments.

[0097] It will also be understood that, although the terms first, second, etc. may be used herein to describe various elements, these elements should not be limited by these terms. These terms are only used to distinguish one element from another. For example, a first contact could be termed a second contact, and, similarly, a second contact could be termed a first contact, without departing from the scope of the present invention. The first contact and the second contact are both contacts, but they are not the same contact.

[0098] The terminology used in the description of the invention herein is for the purpose of describing particular embodiments only and is not intended to be limiting of the invention. As used in the description of the invention and the appended claims, the singular forms "a", "an" and "the" are intended to include the plural forms as well, unless the context clearly indicates otherwise. It will also be understood that the term "and/or" as used herein refers to and encompasses any and all possible combinations of one or more of the associated listed items. It will be further understood that the terms "comprises" and/or "comprising," when used in this specification, specify the presence of stated features, integers, steps, operations, elements, and/or components, but do not preclude the presence or addition of one or more other features, integers, steps, operations, elements, components, and/or groups thereof.

[0099] As used herein, the term "if" may be construed to mean "when" or "upon" or "in response to determining" or "in response to detecting," depending on the context. Similarly, the phrase "if it is determined" or "if [a stated condition or event] is detected" may be construed to mean "upon determining" or "in response to determining" or "upon detecting [the stated condition or event]" or "in response to detecting [the stated condition or event]," depending on the context.

[0100] Embodiments of computing devices, user interfaces for such devices, and associated processes for using such devices are described. In some embodiments, the computing device is a portable communications device such as a mobile telephone that also contains other functions, such as PDA and/or music player functions. Exemplary embodiments of portable multifunction devices include, without limitation, the IPHONE, IPAD, and IPOD TOUCH devices from Apple Computer, Inc. of Cupertino, Calif.

[0101] In the discussion that follows, a computing device that includes a touch-sensitive display is described. It should be understood, however, that the computing device may include one or more other physical user-interface devices, such as a separate display, physical keyboard, a mouse, and/or a joystick.

[0102] The device supports a variety of applications, such as one or more of the following: a drawing application, a presentation application, a word processing application, a website creation application, a disk authoring application, a spreadsheet application, a gaming application, a telephone application, a video-conferencing application, an e-mail application, an instant messaging application, a fitness application, a photo management application, a digital camera application, a digital video camera application, a web browsing application, a digital music player application, a digital video player application, and/or a home automation application.

[0103] The various applications that may be executed on the device may use at least one common physical user-interface device, such as the touch-sensitive surface. One or more functions of the touch-sensitive surface as well as corresponding information displayed on the device may be adjusted and/or varied from one application to the next and/or within a respective application. In this way, a common physical architecture (such as the touch-sensitive sur-

face) of the device may support the variety of applications with user interfaces that are intuitive and transparent.

[0104] The user interfaces may include one or more soft keyboard embodiments. The soft keyboard embodiments may include standard (QWERTY) and/or non-standard configurations of symbols on the displayed icons of the keyboard, such as those described in U.S. patent applications Ser. No. 11/459,606, "Keyboards For Portable Electronic Devices," filed Jul. 24, 2006, and Ser. No. 11/459,615, "Touch Screen Keyboards For Portable Electronic Devices," filed Jul. 24, 2006, the contents of which are hereby incorporated by reference in their entirety. The keyboard embodiments may include a reduced number of icons (or soft keys) relative to the number of keys in existing physical keyboards, such as that for a typewriter. This may make it easier for users to select one or more icons in the keyboard, and thus, one or more corresponding symbols. The keyboard embodiments may be adaptive. For example, displayed icons may be modified in accordance with user actions, such as selecting one or more icons and/or one or more corresponding symbols. One or more applications on the device may utilize common and/or different keyboard embodiments. Thus, the keyboard embodiment used may be tailored to at least some of the applications. In some embodiments, one or more keyboard embodiments may be tailored to a respective user. For example, one or more keyboard embodiments may be tailored to a respective user based on a word usage history (lexicography, slang, individual usage) of the respective user. Some of the keyboard embodiments may be adjusted to reduce a probability of a user error when selecting one or more icons, and thus one or more symbols, when using the soft keyboard embodiments.

[0105] Attention is now directed toward embodiments of portable devices with touch-sensitive displays. FIG. **1**A is a block diagram illustrating portable multifunction device **100** with touch-sensitive display system **112** in accordance with some embodiments. Touch-sensitive display system **112** is sometimes called a "touch screen" for convenience, and is sometimes simply called a touch-sensitive display. Device **100** includes memory **102** (which optionally includes one or more computer readable storage mediums), memory controller **122**, one or more processing units (CPUs) **120**, peripherals interface **118**, RF circuitry **108**, audio circuitry **110**, speaker **111**, microphone **113**, input/output (I/O) subsystem **106**, other input or control devices **116**, and external port **124**. Device **100** optionally includes one or more optical sensors **164**. Device **100** optionally includes one or more intensity sensors **165** for detecting intensity of contacts on device **100** (e.g., a touch-sensitive surface such as touch-sensitive display system **112** of device **100**). Device **100** optionally includes one or more tactile output generators **167** for generating tactile outputs on device **100** (e.g., generating tactile outputs on a touch-sensitive surface such as touch-sensitive display system **112** of device **100** or touchpad of a device). These components optionally communicate over one or more communication buses or signal lines **103**.

[0106] As used in the specification and claims, the term "tactile output" refers to physical displacement of a device relative to a previous position of the device, physical displacement of a component (e.g., a touch-sensitive surface) of a device relative to another component (e.g., housing) of the device, or displacement of the component relative to a center of mass of the device that will be detected by a user with the user's sense of touch. For example, in situations where the device or the component of the device is in contact with a surface of a user that is sensitive to touch (e.g., a finger, palm, or other part of a user's hand), the tactile output generated by the physical displacement will be interpreted by the user as a tactile sensation corresponding to a perceived change in physical characteristics of the device or the component of the device. For example, movement of a touch-sensitive surface (e.g., a touch-sensitive display or trackpad) is, optionally, interpreted by the user as a "down click" or "up click" of a physical actuator button. In some cases, a user will feel a tactile sensation such as an "down click" or "up click" even when there is no movement of a physical actuator button associated with the touch-sensitive surface that is physically pressed (e.g., displaced) by the user's movements. As another example, movement of the touch-sensitive surface is, optionally, interpreted or sensed by the user as "roughness" of the touch-sensitive surface, even when there is no change in smoothness of the touch-sensitive surface. While such interpretations of touch by a user will be subject to the individualized sensory perceptions of the user, there are many sensory perceptions of touch that are common to a large majority of users. Thus, when a tactile output is described as corresponding to a particular sensory perception of a user (e.g., an "up click," a "down click," "roughness"), unless otherwise stated, the generated tactile output corresponds to physical displacement of the device or a component thereof that will generate the described sensory perception for a typical (or average) user.

[0107] It should be appreciated that device **100** is only one example of a portable multifunction device, and that device **100** optionally has more or fewer components than shown, optionally combines two or more components, or optionally has a different configuration or arrangement of the components. The various components shown in FIG. **1**A are implemented in hardware, software, firmware, or a combination thereof, including one or more signal processing and/or application specific integrated circuits.

[0108] Memory **102** optionally includes high-speed random access memory and optionally also includes non-volatile memory, such as one or more magnetic disk storage devices, flash memory devices, or other non-volatile solid-state memory devices. Access to memory **102** by other components of device **100**, such as CPU(s) **120** and the peripherals interface **118**, is, optionally, controlled by memory controller **122**.

[0109] Peripherals interface **118** can be used to couple input and output peripherals of the device to CPU(s) **120** and memory **102**. The one or more processors **120** run or execute various software programs and/or sets of instructions stored in memory **102** to perform various functions for device **100** and to process data.

[0110] In some embodiments, peripherals interface **118**, CPU(s) **120**, and memory controller **122** are, optionally, implemented on a single chip, such as chip **104**. In some other embodiments, they are, optionally, implemented on separate chips.

[0111] RF (radio frequency) circuitry **108** receives and sends RF signals, also called electromagnetic signals. RF circuitry **108** converts electrical signals to/from electromagnetic signals and communicates with communications networks and other communications devices via the electromagnetic signals. RF circuitry **108** optionally includes well-known circuitry for performing these functions, including but not limited to an antenna system, an RF transceiver, one

or more amplifiers, a tuner, one or more oscillators, a digital signal processor, a CODEC chipset, a subscriber identity module (SIM) card, memory, and so forth. RF circuitry **108** optionally communicates with networks, such as the Internet, also referred to as the World Wide Web (WWW), an intranet and/or a wireless network, such as a cellular telephone network, a wireless local area network (LAN) and/or a metropolitan area network (MAN), and other devices by wireless communication. The wireless communication optionally uses any of a plurality of communications standards, protocols and technologies, including but not limited to Global System for Mobile Communications (GSM), Enhanced Data GSM Environment (EDGE), high-speed downlink packet access (HSDPA), high-speed uplink packet access (HSDPA), Evolution, Data-Only (EV-DO), HSPA, HSPA+, Dual-Cell HSPA (DC-HSPDA), long term evolution (LTE), near field communication (NFC), wideband code division multiple access (W-CDMA), code division multiple access (CDMA), time division multiple access (TDMA), Bluetooth, Wireless Fidelity (Wi-Fi) (e.g., IEEE 802.11a, IEEE 802.11ac, IEEE 802.11ax, IEEE 802.11b, IEEE 802.11g and/or IEEE 802.11n), voice over Internet Protocol (VoIP), Wi-MAX, a protocol for e-mail (e.g., Internet message access protocol (IMAP) and/or post office protocol (POP)), instant messaging (e.g., extensible messaging and presence protocol (XMPP), Session Initiation Protocol for Instant Messaging and Presence Leveraging Extensions (SIMPLE), Instant Messaging and Presence Service (IMPS)), and/or Short Message Service (SMS), or any other suitable communication protocol, including communication protocols not yet developed as of the filing date of this document.

[0112] Audio circuitry **110**, speaker **111**, and microphone **113** provide an audio interface between a user and device **100**. Audio circuitry **110** receives audio data from peripherals interface **118**, converts the audio data to an electrical signal, and transmits the electrical signal to speaker **111**. Speaker **111** converts the electrical signal to human-audible sound waves. Audio circuitry **110** also receives electrical signals converted by microphone **113** from sound waves. Audio circuitry **110** converts the electrical signal to audio data and transmits the audio data to peripherals interface **118** for processing. Audio data is, optionally, retrieved from and/or transmitted to memory **102** and/or RF circuitry **108** by peripherals interface **118**. In some embodiments, audio circuitry **110** also includes a headset jack (e.g., **212**, FIG. **2**A). The headset jack provides an interface between audio circuitry **110** and removable audio input/output peripherals, such as output-only headphones or a headset with both output (e.g., a headphone for one or both ears) and input (e.g., a microphone).

[0113] I/O subsystem **106** couples input/output peripherals on device **100**, such as touch-sensitive display system **112** and other input or control devices **116**, with peripherals interface **118**. I/O subsystem **106** optionally includes display controller **156**, optical sensor controller **158**, intensity sensor controller **159**, haptic feedback controller **161**, and one or more input controllers **160** for other input or control devices. The one or more input controllers **160** receive/send electrical signals from/to other input or control devices **116**. The other input or control devices **116** optionally include physical buttons (e.g., push buttons, rocker buttons, etc.), dials, slider switches, joysticks, click wheels, and so forth. In some alternate embodiments, input controller(s) **160** are, optionally, coupled with any (or none) of the following: a keyboard, infrared port, USB port, stylus, and/or a pointer device such as a mouse. The one or more buttons (e.g., **208**, FIG. **2**A) optionally include an up/down button for volume control of speaker **111** and/or microphone **113**. The one or more buttons optionally include a push button (e.g., **206**, FIG. **2**A).

[0114] Touch-sensitive display system **112** provides an input interface and an output interface between the device and a user. Display controller **156** receives and/or sends electrical signals from/to touch-sensitive display system **112**. Touch-sensitive display system **112** displays visual output to the user. The visual output optionally includes graphics, text, icons, video, and any combination thereof (collectively termed "graphics"). In some embodiments, some or all of the visual output corresponds to user-interface objects.

[0115] Touch-sensitive display system **112** has a touch-sensitive surface, sensor or set of sensors that accepts input from the user based on haptic and/or tactile contact. Touch-sensitive display system **112** and display controller **156** (along with any associated modules and/or sets of instructions in memory **102**) detect contact (and any movement or breaking of the contact) on touch-sensitive display system **112** and converts the detected contact into interaction with user-interface objects (e.g., one or more soft keys, icons, web pages or images) that are displayed on touch-sensitive display system **112**. In an exemplary embodiment, a point of contact between touch-sensitive display system **112** and the user corresponds to a finger of the user or a stylus.

[0116] Touch-sensitive display system **112** optionally uses LCD (liquid crystal display) technology, LPD (light emitting polymer display) technology, or LED (light emitting diode) technology, although other display technologies are used in other embodiments. Touch-sensitive display system **112** and display controller **156** optionally detect contact and any movement or breaking thereof using any of a plurality of touch sensing technologies now known or later developed, including but not limited to capacitive, resistive, infrared, and surface acoustic wave technologies, as well as other proximity sensor arrays or other elements for determining one or more points of contact with touch-sensitive display system **112**. In an exemplary embodiment, projected mutual capacitance sensing technology is used, such as that found in the iPhone®, iPod Touch®, and iPad® from Apple Inc. of Cupertino, Calif.

[0117] Touch-sensitive display system **112** optionally has a video resolution in excess of 100 dpi. In some embodiments, the touch screen video resolution is in excess of 400 dpi (e.g., 500 dpi, 800 dpi, or greater). The user optionally makes contact with touch-sensitive display system **112** using any suitable object or appendage, such as a stylus, a finger, and so forth. In some embodiments, the user interface is designed to work with finger-based contacts and gestures, which can be less precise than stylus-based input due to the larger area of contact of a finger on the touch screen. In some embodiments, the device translates the rough finger-based input into a precise pointer/cursor position or command for performing the actions desired by the user.

[0118] In some embodiments, in addition to the touch screen, device **100** optionally includes a touchpad (not shown) for activating or deactivating particular functions. In some embodiments, the touchpad is a touch-sensitive area of the device that, unlike the touch screen, does not display

visual output. The touchpad is, optionally, a touch-sensitive surface that is separate from touch-sensitive display system **112** or an extension of the touch-sensitive surface formed by the touch screen.

[0119] Device **100** also includes power system **162** for powering the various components. Power system **162** optionally includes a power management system, one or more power sources (e.g., battery, alternating current (AC)), a recharging system, a power failure detection circuit, a power converter or inverter, a power status indicator (e.g., a light-emitting diode (LED)) and any other components associated with the generation, management and distribution of power in portable devices.

[0120] Device **100** optionally also includes one or more optical sensors **164**. FIG. **1**A shows an optical sensor coupled with optical sensor controller **158** in I/O subsystem **106**. Optical sensor(s) **164** optionally include charge-coupled device (CCD) or complementary metal-oxide semiconductor (CMOS) phototransistors. Optical sensor(s) **164** receive light from the environment, projected through one or more lens, and converts the light to data representing an image. In conjunction with imaging module **143** (also called a camera module), optical sensor(s) **164** optionally capture still images and/or video. In some embodiments, an optical sensor is located on the back of device **100**, opposite touch-sensitive display system **112** on the front of the device, so that the touch screen is enabled for use as a viewfinder for still and/or video image acquisition. In some embodiments, another optical sensor is located on the front of the device so that the user's image is obtained (e.g., for selfies, for videoconferencing while the user views the other video conference participants on the touch screen, etc.).

[0121] Device **100** optionally also includes one or more contact intensity sensors **165**. FIG. **1**A shows a contact intensity sensor coupled with intensity sensor controller **159** in I/O subsystem **106**. Contact intensity sensor(s) **165** optionally include one or more piezoresistive strain gauges, capacitive force sensors, electric force sensors, piezoelectric force sensors, optical force sensors, capacitive touch-sensitive surfaces, or other intensity sensors (e.g., sensors used to measure the force (or pressure) of a contact on a touch-sensitive surface). Contact intensity sensor(s) **165** receive contact intensity information (e.g., pressure information or a proxy for pressure information) from the environment. In some embodiments, at least one contact intensity sensor is collocated with, or proximate to, a touch-sensitive surface (e.g., touch-sensitive display system **112**). In some embodiments, at least one contact intensity sensor is located on the back of device **100**, opposite touch-screen display system **112** which is located on the front of device **100**.

[0122] Device **100** optionally also includes one or more proximity sensors **166**. FIG. **1**A shows proximity sensor **166** coupled with peripherals interface **118**. Alternately, proximity sensor **166** is coupled with input controller **160** in I/O subsystem **106**. In some embodiments, the proximity sensor turns off and disables touch-sensitive display system **112** when the multifunction device is placed near the user's ear (e.g., when the user is making a phone call).

[0123] Device **100** optionally also includes one or more tactile output generators **167**. FIG. **1**A shows a tactile output generator coupled with haptic feedback controller **161** in I/O subsystem **106**. Tactile output generator(s) **167** optionally include one or more electroacoustic devices such as speakers or other audio components and/or electromechanical devices that convert energy into linear motion such as a motor, solenoid, electroactive polymer, piezoelectric actuator, electrostatic actuator, or other tactile output generating component (e.g., a component that converts electrical signals into tactile outputs on the device). Tactile output generator(s) **167** receive tactile feedback generation instructions from haptic feedback module **133** and generates tactile outputs on device **100** that are capable of being sensed by a user of device **100**. In some embodiments, at least one tactile output generator is collocated with, or proximate to, a touch-sensitive surface (e.g., touch-sensitive display system **112**) and, optionally, generates a tactile output by moving the touch-sensitive surface vertically (e.g., in/out of a surface of device **100**) or laterally (e.g., back and forth in the same plane as a surface of device **100**). In some embodiments, at least one tactile output generator sensor is located on the back of device **100**, opposite touch-sensitive display system **112**, which is located on the front of device **100**.

[0124] Device **100** optionally also includes one or more accelerometers **168**. FIG. **1**A shows accelerometer **168** coupled with peripherals interface **118**. Alternately, accelerometer **168** is, optionally, coupled with an input controller **160** in I/O subsystem **106**. In some embodiments, information is displayed on the touch-screen display in a portrait view or a landscape view based on an analysis of data received from the one or more accelerometers. Device **100** optionally includes, in addition to accelerometer(s) **168**, a magnetometer (not shown) and a GPS (or GLONASS or other global navigation system) receiver (not shown) for obtaining information concerning the location and orientation (e.g., portrait or landscape) of device **100**.

[0125] In some embodiments, the software components stored in memory **102** include operating system **126**, communication module (or set of instructions) **128**, contact/motion module (or set of instructions) **130**, graphics module (or set of instructions) **132**, haptic feedback module (or set of instructions) **133**, text input module (or set of instructions) **134**, Global Positioning System (GPS) module (or set of instructions) **135**, and applications (or sets of instructions) **136**. Furthermore, in some embodiments, memory **102** stores device/global internal state **157**, as shown in FIGS. **1**A and **3**. Device/global internal state **157** includes one or more of: active application state, indicating which applications, if any, are currently active; display state, indicating what applications, views or other information occupy various regions of touch-sensitive display system **112**; sensor state, including information obtained from the device's various sensors and other input or control devices **116**; and location and/or positional information concerning the device's location and/or attitude.

[0126] Operating system **126** (e.g., iOS, Darwin, RTXC, LINUX, UNIX, OS X, WINDOWS, or an embedded operating system such as VxWorks) includes various software components and/or drivers for controlling and managing general system tasks (e.g., memory management, storage device control, power management, etc.) and facilitates communication between various hardware and software components.

[0127] Communication module **128** facilitates communication with other devices over one or more external ports **124** and also includes various software components for handling data received by RF circuitry **108** and/or external port **124**. External port **124** (e.g., Universal Serial Bus (USB), FIREWIRE, etc.) is adapted for coupling directly to

other devices or indirectly over a network (e.g., the Internet, wireless LAN, etc.). In some embodiments, the external port is a multi-pin (e.g., 30-pin) connector that is the same as, or similar to and/or compatible with the 30-pin connector used in some iPhone®, iPod Touch®, and iPad® devices from Apple Inc. of Cupertino, Calif. In some embodiments, the external port is a Lightning connector that is the same as, or similar to and/or compatible with the Lightning connector used in some iPhone®, iPod Touch®, and iPad® devices from Apple Inc. of Cupertino, Calif.

[0128] Contact/motion module **130** optionally detects contact with touch-sensitive display system **112** (in conjunction with display controller **156**) and other touch-sensitive devices (e.g., a touchpad or physical click wheel). Contact/motion module **130** includes various software components for performing various operations related to detection of contact (e.g., by a finger or by a stylus), such as determining if contact has occurred (e.g., detecting a finger-down event), determining an intensity of the contact (e.g., the force or pressure of the contact or a substitute for the force or pressure of the contact), determining if there is movement of the contact and tracking the movement across the touch-sensitive surface (e.g., detecting one or more finger-dragging events), and determining if the contact has ceased (e.g., detecting a finger-up event or a break in contact). Contact/motion module **130** receives contact data from the touch-sensitive surface. Determining movement of the point of contact, which is represented by a series of contact data, optionally includes determining speed (magnitude), velocity (magnitude and direction), and/or an acceleration (a change in magnitude and/or direction) of the point of contact. These operations are, optionally, applied to single contacts (e.g., one finger contacts or stylus contacts) or to multiple simultaneous contacts (e.g., "multitouch"/multiple finger contacts). In some embodiments, contact/motion module **130** and display controller **156** detect contact on a touchpad.

[0129] Contact/motion module **130** optionally detects a gesture input by a user. Different gestures on the touch-sensitive surface have different contact patterns (e.g., different motions, timings, and/or intensities of detected contacts). Thus, a gesture is, optionally, detected by detecting a particular contact pattern. For example, detecting a finger tap gesture includes detecting a finger-down event followed by detecting a finger-up (lift off) event at the same position (or substantially the same position) as the finger-down event (e.g., at the position of an icon). As another example, detecting a finger swipe gesture on the touch-sensitive surface includes detecting a finger-down event followed by detecting one or more finger-dragging events, and subsequently followed by detecting a finger-up (lift off) event. Similarly, tap, swipe, drag, and other gestures are optionally detected for a stylus by detecting a particular contact pattern for the stylus.

[0130] Graphics module **132** includes various known software components for rendering and displaying graphics on touch-sensitive display system **112** or other display, including components for changing the visual impact (e.g., brightness, transparency, saturation, contrast or other visual property) of graphics that are displayed. As used herein, the term "graphics" includes any object that can be displayed to a user, including without limitation text, web pages, icons (such as user-interface objects including soft keys), digital images, videos, animations and the like.

[0131] In some embodiments, graphics module **132** stores data representing graphics to be used. Each graphic is, optionally, assigned a corresponding code. Graphics module **132** receives, from applications etc., one or more codes specifying graphics to be displayed along with, if necessary, coordinate data and other graphic property data, and then generates screen image data to output to display controller **156**.

[0132] Haptic feedback module **133** includes various software components for generating instructions used by tactile output generator(s) **167** to produce tactile outputs at one or more locations on device **100** in response to user interactions with device **100**.

[0133] Text input module **134**, which is, optionally, a component of graphics module **132**, provides soft keyboards for entering text in various applications (e.g., contacts **137**, e-mail **140**, IM **141**, browser **147**, and any other application that needs text input).

[0134] GPS module **135** determines the location of the device and provides this information for use in various applications (e.g., to telephone **138** for use in location-based dialing, to camera **143** as picture/video metadata, and to applications that provide location-based services such as weather widgets, local yellow page widgets, and map/navigation widgets).

[0135] Applications **136** optionally include the following modules (or sets of instructions), or a subset or superset thereof:

[0136] contacts module **137** (sometimes called an address book or contact list);

[0137] telephone module **138**;

[0138] video conferencing module **139**;

[0139] e-mail client module **140**;

[0140] instant messaging (IM) module **141**;

[0141] workout support module **142**;

[0142] camera module **143** for still and/or video images;

[0143] image management module **144**;

[0144] browser module **147**;

[0145] calendar module **148**;

[0146] widget modules **149**, which optionally include one or more of: weather widget **149-1**, stocks widget **149-2**, calculator widget **149-3**, alarm clock widget **149-4**, dictionary widget **149-5**, and other widgets obtained by the user, as well as user-created widgets **149-6**;

[0147] widget creator module **150** for making user-created widgets **149-6**;

[0148] search module **151**;

[0149] video and music player module **152**, which is, optionally, made up of a video player module and a music player module;

[0150] notes module **153**;

[0151] map module **154**; and/or

[0152] online video module **155**.

[0153] Examples of other applications **136** that are, optionally, stored in memory **102** include other word processing applications, other image editing applications, drawing applications, presentation applications, JAVA-enabled applications, encryption, digital rights management, voice recognition, and voice replication.

[0154] In conjunction with touch-sensitive display system **112**, display controller **156**, contact module **130**, graphics module **132**, and text input module **134**, contacts module **137** includes executable instructions to manage an address book or contact list (e.g., stored in application internal state

192 of contacts module 137 in memory 102), including: adding name(s) to the address book; deleting name(s) from the address book; associating telephone number(s), e-mail address(es), physical address(es) or other information with a name; associating an image with a name; categorizing and sorting names; providing telephone numbers and/or e-mail addresses to initiate and/or facilitate communications by telephone 138, video conference 139, e-mail 140, or IM 141; and so forth.

[0155] In conjunction with RF circuitry 108, audio circuitry 110, speaker 111, microphone 113, touch-sensitive display system 112, display controller 156, contact module 130, graphics module 132, and text input module 134, telephone module 138 includes executable instructions to enter a sequence of characters corresponding to a telephone number, access one or more telephone numbers in address book 137, modify a telephone number that has been entered, dial a respective telephone number, conduct a conversation and disconnect or hang up when the conversation is completed. As noted above, the wireless communication optionally uses any of a plurality of communications standards, protocols and technologies.

[0156] In conjunction with RF circuitry 108, audio circuitry 110, speaker 111, microphone 113, touch-sensitive display system 112, display controller 156, optical sensor(s) 164, optical sensor controller 158, contact module 130, graphics module 132, text input module 134, contact list 137, and telephone module 138, videoconferencing module 139 includes executable instructions to initiate, conduct, and terminate a video conference between a user and one or more other participants in accordance with user instructions.

[0157] In conjunction with RF circuitry 108, touch-sensitive display system 112, display controller 156, contact module 130, graphics module 132, and text input module 134, e-mail client module 140 includes executable instructions to create, send, receive, and manage e-mail in response to user instructions. In conjunction with image management module 144, e-mail client module 140 makes it very easy to create and send e-mails with still or video images taken with camera module 143.

[0158] In conjunction with RF circuitry 108, touch-sensitive display system 112, display controller 156, contact module 130, graphics module 132, and text input module 134, the instant messaging module 141 includes executable instructions to enter a sequence of characters corresponding to an instant message, to modify previously entered characters, to transmit a respective instant message (for example, using a Short Message Service (SMS) or Multimedia Message Service (MMS) protocol for telephony-based instant messages or using XMPP, SIMPLE, Apple Push Notification Service (APNs) or IMPS for Internet-based instant messages), to receive instant messages and to view received instant messages. In some embodiments, transmitted and/or received instant messages optionally include graphics, photos, audio files, video files and/or other attachments as are supported in a MMS and/or an Enhanced Messaging Service (EMS). As used herein, "instant messaging" refers to both telephony-based messages (e.g., messages sent using SMS or MMS) and Internet-based messages (e.g., messages sent using XMPP, SIMPLE, APNs, or IMPS).

[0159] In conjunction with RF circuitry 108, touch-sensitive display system 112, display controller 156, contact module 130, graphics module 132, text input module 134, GPS module 135, map module 154, and music player module 146, workout support module 142 includes executable instructions to create workouts (e.g., with time, distance, and/or calorie burning goals); communicate with workout sensors (in sports devices and smart watches); receive workout sensor data; calibrate sensors used to monitor a workout; select and play music for a workout; and display, store and transmit workout data.

[0160] In conjunction with touch-sensitive display system 112, display controller 156, optical sensor(s) 164, optical sensor controller 158, contact module 130, graphics module 132, and image management module 144, camera module 143 includes executable instructions to capture still images or video (including a video stream) and store them into memory 102, modify characteristics of a still image or video, and/or delete a still image or video from memory 102.

[0161] In conjunction with touch-sensitive display system 112, display controller 156, contact module 130, graphics module 132, text input module 134, and camera module 143, image management module 144 includes executable instructions to arrange, modify (e.g., edit), or otherwise manipulate, label, delete, present (e.g., in a digital slide show or album), and store still and/or video images.

[0162] In conjunction with RF circuitry 108, touch-sensitive display system 112, display system controller 156, contact module 130, graphics module 132, and text input module 134, browser module 147 includes executable instructions to browse the Internet in accordance with user instructions, including searching, linking to, receiving, and displaying web pages or portions thereof, as well as attachments and other files linked to web pages.

[0163] In conjunction with RF circuitry 108, touch-sensitive display system 112, display system controller 156, contact module 130, graphics module 132, text input module 134, e-mail client module 140, and browser module 147, calendar module 148 includes executable instructions to create, display, modify, and store calendars and data associated with calendars (e.g., calendar entries, to do lists, etc.) in accordance with user instructions.

[0164] In conjunction with RF circuitry 108, touch-sensitive display system 112, display system controller 156, contact module 130, graphics module 132, text input module 134, and browser module 147, widget modules 149 are mini-applications that are, optionally, downloaded and used by a user (e.g., weather widget 149-1, stocks widget 149-2, calculator widget 149-3, alarm clock widget 149-4, and dictionary widget 149-5) or created by the user (e.g., user-created widget 149-6). In some embodiments, a widget includes an HTML (Hypertext Markup Language) file, a CSS (Cascading Style Sheets) file, and a JavaScript file. In some embodiments, a widget includes an XML (Extensible Markup Language) file and a JavaScript file (e.g., Yahoo! Widgets).

[0165] In conjunction with RF circuitry 108, touch-sensitive display system 112, display system controller 156, contact module 130, graphics module 132, text input module 134, and browser module 147, the widget creator module 150 includes executable instructions to create widgets (e.g., turning a user-specified portion of a web page into a widget).

[0166] In conjunction with touch-sensitive display system 112, display system controller 156, contact module 130, graphics module 132, and text input module 134, search module 151 includes executable instructions to search for text, music, sound, image, video, and/or other files in

memory **102** that match one or more search criteria (e.g., one or more user-specified search terms) in accordance with user instructions.

[0167] In conjunction with touch-sensitive display system **112**, display system controller **156**, contact module **130**, graphics module **132**, audio circuitry **110**, speaker **111**, RF circuitry **108**, and browser module **147**, video and music player module **152** includes executable instructions that allow the user to download and play back recorded music and other sound files stored in one or more file formats, such as MP3 or AAC files, and executable instructions to display, present or otherwise play back videos (e.g., on touch-sensitive display system **112**, or on an external display connected wirelessly or via external port **124**). In some embodiments, device **100** optionally includes the functionality of an MP3 player, such as an iPod (trademark of Apple Inc.).

[0168] In conjunction with touch-sensitive display system **112**, display controller **156**, contact module **130**, graphics module **132**, and text input module **134**, notes module **153** includes executable instructions to create and manage notes, to do lists, and the like in accordance with user instructions.

[0169] In conjunction with RF circuitry **108**, touch-sensitive display system **112**, display system controller **156**, contact module **130**, graphics module **132**, text input module **134**, GPS module **135**, and browser module **147**, map module **154** includes executable instructions to receive, display, modify, and store maps and data associated with maps (e.g., driving directions; data on stores and other points of interest at or near a particular location; and other location-based data) in accordance with user instructions.

[0170] In conjunction with touch-sensitive display system **112**, display system controller **156**, contact module **130**, graphics module **132**, audio circuitry **110**, speaker **111**, RF circuitry **108**, text input module **134**, e-mail client module **140**, and browser module **147**, online video module **155** includes executable instructions that allow the user to access, browse, receive (e.g., by streaming and/or download), play back (e.g., on the touch screen **112**, or on an external display connected wirelessly or via external port **124**), send an e-mail with a link to a particular online video, and otherwise manage online videos in one or more file formats, such as H.**264**. In some embodiments, instant messaging module **141**, rather than e-mail client module **140**, is used to send a link to a particular online video.

[0171] Each of the above identified modules and applications correspond to a set of executable instructions for performing one or more functions described above and the methods described in this application (e.g., the computer-implemented methods and other information processing methods described herein). These modules (i.e., sets of instructions) need not be implemented as separate software programs, procedures or modules, and thus various subsets of these modules are, optionally, combined or otherwise re-arranged in various embodiments. In some embodiments, memory **102** optionally stores a subset of the modules and data structures identified above. Furthermore, memory **102** optionally stores additional modules and data structures not described above.

[0172] In some embodiments, device **100** is a device where operation of a predefined set of functions on the device is performed exclusively through a touch screen and/or a touchpad. By using a touch screen and/or a touchpad as the primary input control device for operation of device **100**, the number of physical input control devices (such as push buttons, dials, and the like) on device **100** is, optionally, reduced.

[0173] The predefined set of functions that are performed exclusively through a touch screen and/or a touchpad optionally include navigation between user interfaces. In some embodiments, the touchpad, when touched by the user, navigates device **100** to a main, home, or root menu from any user interface that is displayed on device **100**. In such embodiments, a "menu button" is implemented using a touchpad. In some other embodiments, the menu button is a physical push button or other physical input control device instead of a touchpad.

[0174] FIG. **1**B is a block diagram illustrating exemplary components for event handling in accordance with some embodiments. In some embodiments, memory **102** (in FIG. **1**A) includes event sorter **170** (e.g., in operating system **126**) and a respective application **136-1** (e.g., any of the aforementioned applications **137-153**).

[0175] Event sorter **170** receives event information and determines the application **136-1** and application view **191** of application **136-1** to which to deliver the event information. Event sorter **170** includes event monitor **171** and event dispatcher module **174**. In some embodiments, application **136-1** includes application internal state **192**, which indicates the current application view(s) displayed on touch-sensitive display **112** when the application is active or executing. In some embodiments, device/global internal state stored in the memory **102** is used by event sorter **170** to determine which application(s) is (are) currently active, and application internal state **192** is used by event sorter **170** to determine application views **191** to which to deliver event information.

[0176] In some embodiments, application internal state **192** includes additional information, such as one or more of: resume information to be used when application **136-1** resumes execution, user interface state information that indicates information being displayed or that is ready for display by application **136-1**, a state queue for enabling the user to go back to a prior state or view of application **136-1**, and a redo/undo queue of previous actions taken by the user.

[0177] Event monitor **171** receives event information from peripherals interface **118**. Event information includes information about a sub-event (e.g., a user touch on touch-sensitive display **112**, as part of a multi-touch gesture). Peripherals interface **118** transmits information it receives from I/O subsystem **106** or a sensor, such as proximity sensor **166**, accelerometer(s) **168**, and/or microphone **113** (through audio circuitry **110**). Information that peripherals interface **118** receives from I/O subsystem **106** includes information from touch-sensitive display **112** or a touch-sensitive surface.

[0178] In some embodiments, event monitor **171** sends requests to the peripherals interface **118** at predetermined intervals. In response, peripherals interface **118** transmits event information. In other embodiments, peripheral interface **118** transmits event information only when there is a significant event (e.g., receiving an input above a predetermined noise threshold and/or for more than a predetermined duration).

[0179] In some embodiments, event sorter **170** also includes a hit view determination module **172** and/or an active event recognizer determination module **173**.

[0180] Hit view determination module **172** provides software procedures for determining where a sub-event has taken place within one or more views, when touch-sensitive display **112** displays more than one view. Views are made up of controls and other elements that a user can see on the display.

[0181] Another aspect of the user interface associated with an application is a set of views, sometimes herein called application views or user interface windows, in which information is displayed and touch-based gestures occur. The application views (of a respective application) in which a touch is detected may correspond to programmatic levels within a programmatic or view hierarchy of the application. For example, the lowest level view in which a touch is detected may be called the hit view, and the set of events that are recognized as proper inputs may be determined based, at least in part, on the hit view of the initial touch that begins a touch-based gesture.

[0182] Hit view determination module **172** receives information related to sub-events of a touch-based gesture. When an application has multiple views organized in a hierarchy, hit view determination module **172** identifies a hit view as the lowest view in the hierarchy which should handle the sub-event. In most circumstances, the hit view is the lowest level view in which an initiating sub-event occurs (e.g., the first sub-event in the sequence of sub-events that form an event or potential event). Once the hit view is identified by the hit view determination module, the hit view typically receives all sub-events related to the same touch or input source for which it was identified as the hit view.

[0183] Active event recognizer determination module **173** determines which view or views within a view hierarchy should receive a particular sequence of sub-events. In some embodiments, active event recognizer determination module **173** determines that only the hit view should receive a particular sequence of sub-events. In other embodiments, active event recognizer determination module **173** determines that all views that include the physical location of a sub-event are actively involved views, and therefore determines that all actively involved views should receive a particular sequence of sub-events. In other embodiments, even if touch sub-events were entirely confined to the area associated with one particular view, views higher in the hierarchy would still remain as actively involved views.

[0184] Event dispatcher module **174** dispatches the event information to an event recognizer (e.g., event recognizer **180**). In embodiments including active event recognizer determination module **173**, event dispatcher module **174** delivers the event information to an event recognizer determined by active event recognizer determination module **173**. In some embodiments, event dispatcher module **174** stores in an event queue the event information, which is retrieved by a respective event receiver module **182**.

[0185] In some embodiments, operating system **126** includes event sorter **170**. Alternatively, application **136-1** includes event sorter **170**. In yet other embodiments, event sorter **170** is a stand-alone module, or a part of another module stored in memory **102**, such as contact/motion module **130**.

[0186] In some embodiments, application **136-1** includes a plurality of event handlers **190** and one or more application views **191**, each of which includes instructions for handling touch events that occur within a respective view of the application's user interface. Each application view **191** of the application **136-1** includes one or more event recognizers **180**. Typically, a respective application view **191** includes a plurality of event recognizers **180**. In other embodiments, one or more of event recognizers **180** are part of a separate module, such as a user interface kit (not shown) or a higher level object from which application **136-1** inherits methods and other properties. In some embodiments, a respective event handler **190** includes one or more of: data updater **176**, object updater **177**, GUI updater **178**, and/or event data **179** received from event sorter **170**. Event handler **190** may utilize or call data updater **176**, object updater **177** or GUI updater **178** to update the application internal state **192**. Alternatively, one or more of the application views **191** includes one or more respective event handlers **190**. Also, in some embodiments, one or more of data updater **176**, object updater **177**, and GUI updater **178** are included in a respective application view **191**.

[0187] A respective event recognizer **180** receives event information (e.g., event data **179**) from event sorter **170**, and identifies an event from the event information. Event recognizer **180** includes event receiver **182** and event comparator **184**. In some embodiments, event recognizer **180** also includes at least a subset of: metadata **183**, and event delivery instructions **188** (which may include sub-event delivery instructions).

[0188] Event receiver **182** receives event information from event sorter **170**. The event information includes information about a sub-event, for example, a touch or a touch movement. Depending on the sub-event, the event information also includes additional information, such as location of the sub-event. When the sub-event concerns motion of a touch the event information may also include speed and direction of the sub-event. In some embodiments, events include rotation of the device from one orientation to another (e.g., from a portrait orientation to a landscape orientation, or vice versa), and the event information includes corresponding information about the current orientation (also called device attitude) of the device.

[0189] Event comparator **184** compares the event information to predefined event or sub-event definitions and, based on the comparison, determines an event or sub-event, or determines or updates the state of an event or sub-event. In some embodiments, event comparator **184** includes event definitions **186**. Event definitions **186** contain definitions of events (e.g., predefined sequences of sub-events), for example, event **1** (**187-1**), event **2** (**187-2**), and others. In some embodiments, sub-events in an event **187** include, for example, touch begin, touch end, touch movement, touch cancellation, and multiple touching. In one example, the definition for event **1** (**187-1**) is a double-tap on a displayed object. The double-tap, for example, comprises a first touch (touch begin) on the displayed object for a predetermined phase, a first lift-off (touch end) for a predetermined phase, a second touch (touch begin) on the displayed object for a predetermined phase, and a second lift-off (touch end) for a predetermined phase. In another example, the definition for event **2** (**187-2**) is a dragging on a displayed object. The dragging, for example, comprises a touch (or contact) on the displayed object for a predetermined phase, a movement of the touch across touch-sensitive display **112**, and lift-off of the touch (touch end). In some embodiments, the event also includes information for one or more associated event handlers **190**.

[0190] In some embodiments, event definition **187** includes a definition of an event for a respective user-interface object. In some embodiments, event comparator **184** performs a hit test to determine which user-interface object is associated with a sub-event. For example, in an application view in which three user-interface objects are displayed on touch-sensitive display **112**, when a touch is detected on touch-sensitive display **112**, event comparator **184** performs a hit test to determine which of the three user-interface objects is associated with the touch (sub-event). If each displayed object is associated with a respective event handler **190**, the event comparator uses the result of the hit test to determine which event handler **190** should be activated. For example, event comparator **184** selects an event handler associated with the sub-event and the object triggering the hit test.

[0191] In some embodiments, the definition for a respective event **187** also includes delayed actions that delay delivery of the event information until after it has been determined whether the sequence of sub-events does or does not correspond to the event recognizer's event type.

[0192] When a respective event recognizer **180** determines that the series of sub-events do not match any of the events in event definitions **186**, the respective event recognizer **180** enters an event impossible, event failed, or event ended state, after which it disregards subsequent sub-events of the touch-based gesture. In this situation, other event recognizers, if any, that remain active for the hit view continue to track and process sub-events of an ongoing touch-based gesture.

[0193] In some embodiments, a respective event recognizer **180** includes metadata **183** with configurable properties, flags, and/or lists that indicate how the event delivery system should perform sub-event delivery to actively involved event recognizers. In some embodiments, metadata **183** includes configurable properties, flags, and/or lists that indicate how event recognizers may interact with one another. In some embodiments, metadata **183** includes configurable properties, flags, and/or lists that indicate whether sub-events are delivered to varying levels in the view or programmatic hierarchy.

[0194] In some embodiments, a respective event recognizer **180** activates event handler **190** associated with an event when one or more particular sub-events of an event are recognized. In some embodiments, a respective event recognizer **180** delivers event information associated with the event to event handler **190**. Activating an event handler **190** is distinct from sending (and deferred sending) sub-events to a respective hit view. In some embodiments, event recognizer **180** throws a flag associated with the recognized event, and event handler **190** associated with the flag catches the flag and performs a predefined process.

[0195] In some embodiments, event delivery instructions **188** include sub-event delivery instructions that deliver event information about a sub-event without activating an event handler. Instead, the sub-event delivery instructions deliver event information to event handlers associated with the series of sub-events or to actively involved views. Event handlers associated with the series of sub-events or with actively involved views receive the event information and perform a predetermined process.

[0196] In some embodiments, data updater **176** creates and updates data used in application **136-1**. For example, data updater **176** updates the telephone number used in contacts module **137**, or stores a video file used in video and music player module **145**. In some embodiments, object updater **177** creates and updates objects used in application **136-1**. For example, object updater **176** creates a new user-interface object or updates the position of a user-interface object. GUI updater **178** updates the GUI. For example, GUI updater **178** prepares display information and sends it to graphics module **132** for display on a touch-sensitive display.

[0197] In some embodiments, event handler(s) **190** includes or has access to data updater **176**, object updater **177**, and GUI updater **178**. In some embodiments, data updater **176**, object updater **177**, and GUI updater **178** are included in a single module of a respective application **136-1** or application view **191**. In other embodiments, they are included in two or more software modules.

[0198] It shall be understood that the foregoing discussion regarding event handling of user touches on touch-sensitive displays also applies to other forms of user inputs to operate multifunction devices **100** with input-devices, not all of which are initiated on touch screens, e.g., coordinating mouse movement and mouse button presses with or without single or multiple keyboard presses or holds, user movements taps, drags, scrolls, etc., on touch-pads, pen stylus inputs, movement of the device, oral instructions, detected eye movements, biometric inputs, and/or any combination thereof, which may be utilized as inputs corresponding to sub-events which define an event to be recognized.

[0199] FIG. **2**A illustrates a portable multifunction device **100** having a touch screen (e.g., touch-sensitive display system **112**, FIG. **1**A) in accordance with some embodiments. The touch screen optionally displays one or more graphics within user interface (UI) **200**. In this embodiment, as well as others described below, a user is enabled to select one or more of the graphics by making a gesture on the graphics, for example, with one or more fingers **202** (not drawn to scale in the figure) or one or more styluses **203** (not drawn to scale in the figure). In some embodiments, selection of one or more graphics occurs when the user breaks contact with the one or more graphics. In some embodiments, the gesture optionally includes one or more taps, one or more swipes (from left to right, right to left, upward and/or downward) and/or a rolling of a finger (from right to left, left to right, upward and/or downward) that has made contact with device **100**. In some implementations or circumstances, inadvertent contact with a graphic does not select the graphic. For example, a swipe gesture that sweeps over an application icon optionally does not select the corresponding application when the gesture corresponding to selection is a tap.

[0200] Device **100** optionally also includes one or more physical buttons, such as "home" or menu button **204**. As described previously, menu button **204** is, optionally, used to navigate to any application **136** in a set of applications that are, optionally executed on device **100**. Alternatively, in some embodiments, the menu button is implemented as a soft key in a GUI displayed on the touch-screen display.

[0201] In some embodiments, device **100** includes the touch-screen display, menu button **204**, push button **206** for powering the device on/off and locking the device, volume adjustment button(s) **208**, Subscriber Identity Module (SIM) card slot **210**, head set jack **212**, and docking/charging external port **124**. Push button **206** is, optionally, used to turn the power on/off on the device by depressing the button and

holding the button in the depressed state for a predefined time interval; to lock the device by depressing the button and releasing the button before the predefined time interval has elapsed; and/or to unlock the device or initiate an unlock process. In some embodiments, device **100** also accepts verbal input for activation or deactivation of some functions through microphone **113**. Device **100** also, optionally, includes one or more contact intensity sensors **165** for detecting intensity of contacts on touch-sensitive display system **112** and/or one or more tactile output generators **167** for generating tactile outputs for a user of device **100**.

[0202] FIG. **2**B illustrates an exemplary user interface on a device (e.g., device **100**, FIG. **1**A) with a touch-sensitive surface **251** (e.g., a tablet or touchpad) that is separate from the display **250**. Device **100** also, optionally, includes one or more contact intensity sensors (e.g., one or more of sensors **259**) for detecting intensity of contacts on touch-sensitive surface **251** and/or one or more tactile output generators **257** for generating tactile outputs for a user of device **100**.

[0203] Although many of the examples that follow will be given with reference to inputs on touch screen display **112** (where the touch-sensitive surface and the display are combined), in some embodiments, the device detects inputs on a touch-sensitive surface that is separate from the display, as shown in FIG. **2**B. In some embodiments, the touch-sensitive surface (e.g., **251** in FIG. **2**B) has a primary axis (e.g., **252** in FIG. **2**B) that corresponds to a primary axis (e.g., **253** in FIG. **2**B) on the display (e.g., **250**). In accordance with these embodiments, the device detects contacts (e.g., **260** and **262** in FIG. **2**B) with the touch-sensitive surface **251** at locations that correspond to respective locations on the display (e.g., in FIG. **2**B, **260** corresponds to **268** and **262** corresponds to **270**). In this way, user inputs (e.g., contacts **260** and **262**, and movements thereof) detected by the device on the touch-sensitive surface (e.g., **251** in FIG. **2**B) are used by the device to manipulate the user interface on the display (e.g., **250** in FIG. **2**B) of the multifunction device when the touch-sensitive surface is separate from the display. It should be understood that similar methods are, optionally, used for other user interfaces described herein.

[0204] Additionally, while the following examples are given primarily with reference to finger inputs (e.g., finger contacts, finger tap gestures, finger swipe gestures, etc.), it should be understood that, in some embodiments, one or more of the finger inputs are replaced with input from another input device (e.g., a mouse based input or a stylus input). For example, a swipe gesture is, optionally, replaced with a mouse click (e.g., instead of a contact) followed by movement of the cursor along the path of the swipe (e.g., instead of movement of the contact). As another example, a tap gesture is, optionally, replaced with a mouse click while the cursor is located over the location of the tap gesture (e.g., instead of detection of the contact followed by ceasing to detect the contact). Similarly, when multiple user inputs are simultaneously detected, it should be understood that multiple computer mice are, optionally, used simultaneously, or a mouse and finger contacts are, optionally, used simultaneously.

[0205] As used herein, the term "focus selector" refers to an input element that indicates a current part of a user interface with which a user is interacting. In some implementations that include a cursor or other location marker, the cursor acts as a "focus selector," so that when an input (e.g., a press input) is detected on a touch-sensitive surface (e.g., touchpad or touch-sensitive surface **251** in FIG. **2**B) while the cursor is over a particular user interface element (e.g., a button, window, slider or other user interface element), the particular user interface element is adjusted in accordance with the detected input. In some implementations that include a touch-screen display (e.g., touch-sensitive display system **112** in FIG. **1**A or the touch screen in FIG. **2**A) that enables direct interaction with user interface elements on the touch-screen display, a detected contact on the touch-screen acts as a "focus selector," so that when an input (e.g., a press input by the contact) is detected on the touch-screen display at a location of a particular user interface element (e.g., a button, window, slider or other user interface element), the particular user interface element is adjusted in accordance with the detected input. In some implementations, focus is moved from one region of a user interface to another region of the user interface without corresponding movement of a cursor or movement of a contact on a touch-screen display (e.g., by using a tab key or arrow keys to move focus from one button to another button); in these implementations, the focus selector moves in accordance with movement of focus between different regions of the user interface. Without regard to the specific form taken by the focus selector, the focus selector is generally the user interface element (or contact on a touch-screen display) that is controlled by the user so as to communicate the user's intended interaction with the user interface (e.g., by indicating, to the device, the element of the user interface with which the user is intending to interact). For example, the location of a focus selector (e.g., a cursor, a contact, or a selection box) over a respective button while a press input is detected on the touch-sensitive surface (e.g., a touchpad or touch screen) will indicate that the user is intending to activate the respective button (as opposed to other user interface elements shown on a display of the device).

[0206] As used in the specification and claims, the term "intensity" of a contact on a touch-sensitive surface refers to the force or pressure (force per unit area) of a contact (e.g., a finger contact or a stylus contact) on the touch-sensitive surface, or to a substitute (proxy) for the force or pressure of a contact on the touch-sensitive surface. The intensity of a contact has a range of values that includes at least four distinct values and more typically includes hundreds of distinct values (e.g., at least **256**). Intensity of a contact is, optionally, determined (or measured) using various approaches and various sensors or combinations of sensors. For example, one or more force sensors underneath or adjacent to the touch-sensitive surface are, optionally, used to measure force at various points on the touch-sensitive surface. In some implementations, force measurements from multiple force sensors are combined (e.g., a weighted average or a sum) to determine an estimated force of a contact. Similarly, a pressure-sensitive tip of a stylus is, optionally, used to determine a pressure of the stylus on the touch-sensitive surface. Alternatively, the size of the contact area detected on the touch-sensitive surface and/or changes thereto, the capacitance of the touch-sensitive surface proximate to the contact and/or changes thereto, and/or the resistance of the touch-sensitive surface proximate to the contact and/or changes thereto are, optionally, used as a substitute for the force or pressure of the contact on the touch-sensitive surface. In some implementations, the substitute measurements for contact force or pressure are used directly to determine whether an intensity threshold has been

exceeded (e.g., the intensity threshold is described in units corresponding to the substitute measurements). In some implementations, the substitute measurements for contact force or pressure are converted to an estimated force or pressure and the estimated force or pressure is used to determine whether an intensity threshold has been exceeded (e.g., the intensity threshold is a pressure threshold measured in units of pressure). Using the intensity of a contact as an attribute of a user input allows for user access to additional device functionality that may otherwise not be readily accessible by the user on a reduced-size device with limited real estate for displaying affordances (e.g., on a touch-sensitive display) and/or receiving user input (e.g., via a touch-sensitive display, a touch-sensitive surface, or a physical/mechanical control such as a knob or a button).

[0207] In some embodiments, contact/motion module **130** uses a set of one or more intensity thresholds to determine whether an operation has been performed by a user (e.g., to determine whether a user has "clicked" on an icon). In some embodiments, at least a subset of the intensity thresholds are determined in accordance with software parameters (e.g., the intensity thresholds are not determined by the activation thresholds of particular physical actuators and can be adjusted without changing the physical hardware of device **100**). For example, a mouse "click" threshold of a trackpad or touch-screen display can be set to any of a large range of predefined thresholds values without changing the trackpad or touch-screen display hardware. Additionally, in some implementations a user of the device is provided with software settings for adjusting one or more of the set of intensity thresholds (e.g., by adjusting individual intensity thresholds and/or by adjusting a plurality of intensity thresholds at once with a system-level click "intensity" parameter).

[0208] As used in the specification and claims, the term "characteristic intensity" of a contact refers to a characteristic of the contact based on one or more intensities of the contact. In some embodiments, the characteristic intensity is based on multiple intensity samples. The characteristic intensity is, optionally, based on a predefined number of intensity samples, or a set of intensity samples collected during a predetermined time period (e.g., 0.05, 0.1, 0.2, 0.5, 1, 2, 5, 10 seconds) relative to a predefined event (e.g., after detecting the contact, prior to detecting liftoff of the contact, before or after detecting a start of movement of the contact, prior to detecting an end of the contact, before or after detecting an increase in intensity of the contact, and/or before or after detecting a decrease in intensity of the contact). A characteristic intensity of a contact is, optionally based on one or more of: a maximum value of the intensities of the contact, a mean value of the intensities of the contact, an average value of the intensities of the contact, a top 10 percentile value of the intensities of the contact, a value at the half maximum of the intensities of the contact, a value at the 90 percent maximum of the intensities of the contact, or the like. In some embodiments, the duration of the contact is used in determining the characteristic intensity (e.g., when the characteristic intensity is an average of the intensity of the contact over time). In some embodiments, the characteristic intensity is compared to a set of one or more intensity thresholds to determine whether an operation has been performed by a user. For example, the set of one or more intensity thresholds may include a first intensity threshold and a second intensity threshold. In this example, a contact with a characteristic intensity that does not exceed the first threshold results in a first operation, a contact with a characteristic intensity that exceeds the first intensity threshold and does not exceed the second intensity threshold results in a second operation, and a contact with a characteristic intensity that exceeds the second intensity threshold results in a third operation. In some embodiments, a comparison between the characteristic intensity and one or more intensity thresholds is used to determine whether or not to perform one or more operations (e.g., whether to perform a respective option or forgo performing the respective operation) rather than being used to determine whether to perform a first operation or a second operation.

[0209] In some embodiments, a portion of a gesture is identified for purposes of determining a characteristic intensity. For example, a touch-sensitive surface may receive a continuous swipe contact transitioning from a start location and reaching an end location (e.g., a drag gesture), at which point the intensity of the contact increases. In this example, the characteristic intensity of the contact at the end location may be based on only a portion of the continuous swipe contact, and not the entire swipe contact (e.g., only the portion of the swipe contact at the end location). In some embodiments, a smoothing algorithm may be applied to the intensities of the swipe contact prior to determining the characteristic intensity of the contact. For example, the smoothing algorithm optionally includes one or more of: an unweighted sliding-average smoothing algorithm, a triangular smoothing algorithm, a median filter smoothing algorithm, and/or an exponential smoothing algorithm. In some circumstances, these smoothing algorithms eliminate narrow spikes or dips in the intensities of the swipe contact for purposes of determining a characteristic intensity.

[0210] The user interface figures (e.g., FIGS. **5**E and **35**B-**35**H) described below optionally include various intensity diagrams that depict an example of the current intensity of the contact on the touch-sensitive surface relative to one or more intensity thresholds (e.g., a contact detection intensity threshold IT_0, a light press intensity threshold IT_L, a deep press intensity threshold IT_D, and/or one or more other intensity thresholds). This intensity diagram is typically not part of the displayed user interface, but is provided to aid in the interpretation of the figures. In some embodiments, the light press intensity threshold corresponds to an intensity at which the device will perform operations typically associated with clicking a button of a physical mouse or a trackpad. In some embodiments, the deep press intensity threshold corresponds to an intensity at which the device will perform operations that are different from operations typically associated with clicking a button of a physical mouse or a trackpad. In some embodiments, when a contact is detected with a characteristic intensity below the light press intensity threshold (e.g., and above a nominal contact-detection intensity threshold IT_0 below which the contact is no longer detected), the device will move a focus selector in accordance with movement of the contact on the touch-sensitive surface without performing an operation associated with the light press intensity threshold or the deep press intensity threshold. Generally, unless otherwise stated, these intensity thresholds are consistent between different sets of user interface figures.

[0211] In some embodiments, the response of the device to inputs detected by the device depends on criteria based on the contact intensity during the input. For example, for some "light press" inputs, the intensity of a contact exceeding a

first intensity threshold during the input triggers a first response. In some embodiments, the response of the device to inputs detected by the device depends on criteria that include both the contact intensity during the input and time-based criteria. For example, for some "deep press" inputs, the intensity of a contact exceeding a second intensity threshold during the input, greater than the first intensity threshold for a light press, triggers a second response only if a delay time has elapsed between meeting the first intensity threshold and meeting the second intensity threshold. This delay time is typically less than 200 ms in duration (e.g., 40, 100, or 120 ms, depending on the magnitude of the second intensity threshold, with the delay time increasing as the second intensity threshold increases). This delay time helps to avoid accidental deep press inputs. As another example, for some "deep press" inputs, there is a reduced-sensitivity time period that occurs after the time at which the first intensity threshold is met. During the reduced-sensitivity time period, the second intensity threshold is increased. This temporary increase in the second intensity threshold also helps to avoid accidental deep press inputs. For other deep press inputs, the response to detection of a deep press input does not depend on time-based criteria.

[0212] In some embodiments, one or more of the input intensity thresholds and/or the corresponding outputs vary based on one or more factors, such as user settings, contact motion, input timing, application running, rate at which the intensity is applied, number of concurrent inputs, user history, environmental factors (e.g., ambient noise), focus selector position, and the like. Exemplary factors are described in U.S. patent application Ser. Nos. 14/399,606 and 14/624,296, which are incorporated by reference herein in their entireties.

[0213] An increase of characteristic intensity of the contact from an intensity below the light press intensity threshold IT_L to an intensity between the light press intensity threshold IT_L and the deep press intensity threshold IT_D is sometimes referred to as a "light press" input. An increase of characteristic intensity of the contact from an intensity below the deep press intensity threshold IT_D to an intensity above the deep press intensity threshold IT_D is sometimes referred to as a "deep press" input. An increase of characteristic intensity of the contact from an intensity below the contact-detection intensity threshold IT_0 to an intensity between the contact-detection intensity threshold IT_0 and the light press intensity threshold IT_L is sometimes referred to as detecting the contact on the touch-surface. A decrease of characteristic intensity of the contact from an intensity above the contact-detection intensity threshold IT_0 to an intensity below the contact-detection intensity threshold IT_0 is sometimes referred to as detecting liftoff of the contact from the touch-surface. In some embodiments IT_0 is zero. In some embodiments, IT_0 is greater than zero. In some illustrations a shaded circle or oval is used to represent intensity of a contact on the touch-sensitive surface. In some illustrations, a circle or oval without shading is used represent a respective contact on the touch-sensitive surface without specifying the intensity of the respective contact.

[0214] In some embodiments, described herein, one or more operations are performed in response to detecting a gesture that includes a respective press input or in response to detecting the respective press input performed with a respective contact (or a plurality of contacts), where the respective press input is detected based at least in part on detecting an increase in intensity of the contact (or plurality of contacts) above a press-input intensity threshold. In some embodiments, the respective operation is performed in response to detecting the increase in intensity of the respective contact above the press-input intensity threshold (e.g., the respective operation is performed on a "down stroke" of the respective press input). In some embodiments, the press input includes an increase in intensity of the respective contact above the press-input intensity threshold and a subsequent decrease in intensity of the contact below the press-input intensity threshold, and the respective operation is performed in response to detecting the subsequent decrease in intensity of the respective contact below the press-input threshold (e.g., the respective operation is performed on an "up stroke" of the respective press input).

[0215] In some embodiments, the device employs intensity hysteresis to avoid accidental inputs sometimes termed "jitter," where the device defines or selects a hysteresis intensity threshold with a predefined relationship to the press-input intensity threshold (e.g., the hysteresis intensity threshold is X intensity units lower than the press-input intensity threshold or the hysteresis intensity threshold is 75%, 90%, or some reasonable proportion of the press-input intensity threshold). Thus, in some embodiments, the press input includes an increase in intensity of the respective contact above the press-input intensity threshold and a subsequent decrease in intensity of the contact below the hysteresis intensity threshold that corresponds to the press-input intensity threshold, and the respective operation is performed in response to detecting the subsequent decrease in intensity of the respective contact below the hysteresis intensity threshold (e.g., the respective operation is performed on an "up stroke" of the respective press input). Similarly, in some embodiments, the press input is detected only when the device detects an increase in intensity of the contact from an intensity at or below the hysteresis intensity threshold to an intensity at or above the press-input intensity threshold and, optionally, a subsequent decrease in intensity of the contact to an intensity at or below the hysteresis intensity, and the respective operation is performed in response to detecting the press input (e.g., the increase in intensity of the contact or the decrease in intensity of the contact, depending on the circumstances).

[0216] For ease of explanation, the description of operations performed in response to a press input associated with a press-input intensity threshold or in response to a gesture including the press input are, optionally, triggered in response to detecting: an increase in intensity of a contact above the press-input intensity threshold, an increase in intensity of a contact from an intensity below the hysteresis intensity threshold to an intensity above the press-input intensity threshold, a decrease in intensity of the contact below the press-input intensity threshold, or a decrease in intensity of the contact below the hysteresis intensity threshold corresponding to the press-input intensity threshold. Additionally, in examples where an operation is described as being performed in response to detecting a decrease in intensity of a contact below the press-input intensity threshold, the operation is, optionally, performed in response to detecting a decrease in intensity of the contact below a hysteresis intensity threshold corresponding to, and lower than, the press-input intensity threshold. As described above, in some embodiments, the triggering of these responses also depends on time-based criteria being met (e.g., a delay time

has elapsed between a first intensity threshold being met and a second intensity threshold being met).

[0217] FIG. **3**A is a schematic of a user interface for a menu of applications on portable multifunction device **100**, in accordance with some embodiments. Similar user interfaces may be implemented on a desktop device in accordance with some embodiments. In some embodiments, user interface **300** includes the following elements, or a subset or superset thereof:

[0218] Signal strength indicator(s) **302** for wireless communication(s), such as cellular and Wi-Fi signals;

[0219] Time **304**;

[0220] Bluetooth indicator **305**;

[0221] Battery status indicator **306**;

[0222] Tray **308** with icons for frequently used applications, such as:

[0223] Phone **138**, which may include an indicator **314** of the number of missed calls or voicemail messages;

[0224] E-mail client **140**, which may include an indicator **310** of the number of unread e-mails;

[0225] Browser **147**; and

[0226] Video and music player **145**, also referred to as iPod (trademark of Apple Inc.) module **152**; and

[0227] Icons for other applications, such as:

[0228] IM **141**;

[0229] Calendar **148**;

[0230] Image management **144**;

[0231] Camera **143**;

[0232] Online video module **145**, also referred to as YouTube (trademark of Google Inc.) module **145**;

[0233] Stocks **149-2**;

[0234] Map **146**;

[0235] Weather **149-1**;

[0236] Dictionary **149-3**;

[0237] User-Created Widget **149-6**;

[0238] Notes **153**;

[0239] Settings **312**, which provides access to settings for device **100** and its various applications **136**;

[0240] Word processor **153-1**;

[0241] Drawing **153-2**;

[0242] Spreadsheet **153-3**; and

[0243] Presentation **153-4**.

[0244] FIG. **3**B is an illustrative diagram of a portable computing system including a portable multifunction device **100** and a physical keyboard **370**, in accordance with some embodiments. The portable multifunction device **100** may be, for example, an IPAD device from Apple Computer, Inc. of Cupertino, Calif., or any other portable computing device. As explained above with reference to FIGS. **1**A-**1**B and **2**A-**2**B, the portable multifunction device **100** is configured to acquire capacitive, resistive, optical, acoustic, or even inductive, mechanical, chemical, or electromagnetic measurements that indicate the points of contacts with the touch screen **112**. In addition to the touch screen **112**, the portable multifunction device **100** is configured to receive inputs from other sources, such as the physical keyboard **370**.

[0245] In some embodiments, the physical keyboard **370** is communicatively coupled to the portable multifunction device **100** via a contact or array of contacts (e.g., Smart Connect from Apple Computer, Inc. of Cupertino, Calif.), via a wired connection (e.g., USB, PS/2), or via a wireless communication link (e.g., optical, Bluetooth, Wi-Fi, or the like). In some embodiments, a connector **368** of the portable multifunction device **100** couples to and communicates with the physical keyboard **370**. For example, a case may be attached to the portable multifunction device **100** through the connector **368**, and the case is also attached to or communicatively coupled to the rear surface of the keyboard **370** to establish communication channels.

[0246] As can be seen in FIG. **3**B, the physical keyboard **370** includes a set of physical keys, i.e., not virtual keys displayed on a flat touch-screen. In some embodiments, a subset of the physical keys has a QWERTY, Dvorak, or other keyboard layout with alphanumeric, numeric, and/or editing/function sections (e.g., standard, extended, or compact) according to ISO/IEC 9995, ANSI-INCITS 154-1988, JIS X 6002-1980, or other similar standards. Each physical key has at least one associated input. The input may be associated with a visible or printable character, a non-visible or non-printable character, a function, or some other input. The input associated with a physical key may be shown by a letter, word, symbol, or other indicia shown (e.g., printed, embossed, engraved, and/or raised) on the surface of the key in Latin script, Arabic characters, Chinese characters, or any other suitable script or font.

[0247] Relative to conventional keyboards, the keyboard **270** conserves space by removing conventional keys that are not used often and frees up keyboard space to make room for new multi-functional keys, i.e., reducing the overall number of keys. For example, conventional full-size keyboards often have a pair of open and close punctuation characters shown on separate keys (e.g., keys "9" and "0"). Instead of separate keys for separate characters, the keyboard **370**, in accordance with some embodiments, has a physical key **378** that is associated with more than one pair of punctuation characters, e.g., both { } and [ ] as indicated by the characters shown on the key **378**. When a user actuates the key **378** by pressing on the key, the system may respond by entering {, }, [, or], as described in greater detail below with reference to FIGS. **5**A-**5**J.

[0248] In addition to character keys, and depending on the embodiment, the keyboard **370** includes one or more of the following multifunction keys: a command key, such as a home key (e.g., indicated by a square and located next to numeral 1), an emoji key, a select key, a tab key, an option key, a cmd key, a share key, a shift key, a notification key (e.g., shown next to +/= and delete keys), arrows and so on. In some embodiments, selection of a combination of a command key and a character key allows a specific character of a plurality of characters associated with one key to be entered. For example, the selection of a combination of the command key "option" and the punctuation character key **378** allows an input of] to be entered. In other embodiments, command keys may be used to execute commands that are not necessarily associated with any characters. For example, pressing a particular command key or combination of command keys may cause the system to execute certain functions, such as switching between applications or the like. The functions of these command keys are described in greater detail below.

[0249] FIG. **3**B also illustrates a partial exploded oblique view of a portion of the keyboard **370**. As shown in FIG. **3**B, and in some embodiments, the keyboard **370** includes sensors **374** operatively connected to the keyboard surface **372** of the physical keyboard **370**. In some embodiments, the surface **372** includes individual keycaps and/or the area outside the keys. In some embodiments, the keyboard surface **372** includes an external side and an internal side

opposite from the external side. In some embodiments, the external side contains the label for each key (e.g., "A") and provides an engagement surface for a finger, stylus, or other object as described above. In some embodiments, the internal side of the keyboard surface **372** provides a connection surface to which components that are internal to the key attach, including the sensors **374**. In some embodiments, a signal generated by the sensors **374**, which corresponds to an input associated with a contact on the physical keyboard surface **372**, is received by the processor of the portable multifunction device **100**. In some embodiments, similar to the contact intensity sensor(s) **165** in the portable multifunction device **100** described above, these sensors **374** are configured to acquire contact intensity information (e.g., pressure information or a proxy for pressure information). In some embodiments, at least a portion of the physical keyboard **370** has a touch-sensitive surface, and a subset of the sensors **374** is collocated with, or proximate to, the touch-sensitive surface of the physical keyboard **370**. The usage of the sensors in connection with the keyboard **370** are described in greater detail below with reference to FIGS. **31**A-**31**B, **32**A-**32**L, **35**A-**35**H, and **38**A-**38**B.

User Interfaces and Associated Processes

[0250] Attention is now directed towards embodiments of processes and associated user interfaces ("UI") that may be implemented on an electronic device with a display and/or a touch-sensitive display, such as the portable multifunction device **100**.

[0251] Parenthesis Helper

[0252] FIGS. **4**A-**4**C are flow charts illustrating a method **400** of punctuation character entry, in accordance with some embodiments. FIGS. **5**A-**5**J, which illustrate exemplary user interfaces for punctuation character entry, are used to illustrate the processes depicted in FIGS. **4**A-**4**C. The method **400** is performed at a portable multifunction device (e.g., the device **100** in FIG. **1**A) with a touch-sensitive display (e.g., the touch screen display **112** in FIG. **1**A).

[0253] As described below, the method **400** provides an efficient mechanism for entering punctuation characters at a portable multifunction device. This method is faster and easier to perform than conventional punctuation character entry methods and systems, e.g., conventional punctuation character entry through a conventional keyboard with more than one key associated with one pair of open and close punctuation characters. The method is also intuitive for users, thereby reducing the cognitive burden on the user, and creating a more efficient human-machine interface. A more efficient input mechanism also requires less computing resources, thereby increasing battery life of the device.

[0254] The device **100** provides (**402**) a key on which is depicted at least one pair of open and close punctuation characters. In some embodiments, the key is a physical key (**404**) on a physical keyboard coupled to the portable multifunction device. Also in some embodiments. The physical keyboard contains at least one sensor (e.g., the sensors **374**, FIG. **3**B), e.g., for detecting contact and/or contact intensities of inputs on the key. As explained above in connection with FIG. **3**B, in some embodiments, the keyboard **370** is communicatively coupled to the portable multifunction device **100** by one or more contacts (e.g., Smart Connect from Apple Computer, Inc. of Cupertino, Calif.), via a wired connection (e.g., USB, PS/2), or via a wireless communication link (e.g., optical, Bluetooth, Wi-Fi, or the like).

[0255] Having one physical key for multiple pairs of open and close punctuation characters allows a user to use the physical keyboard for punctuation entries without reaching up from the keyboard. Further, replacing multiple punctuation character keys on conventional keyboard with one dedicated punctuation character key saves space, thus making the improved keyboard suitable for portable multifunction devices.

[0256] In some embodiments (e.g., as depicted in FIG. **5**A) both { } and [ ] are displayed (**406**) (e.g., printed, embossed, engraved, and/or raised) on a punctuation character key **378** of the physical keyboard **370**. In some embodiments, the punctuation character key is a virtual key (**408**) displayed on the touch screen display **112**. In some embodiments, one or more pairs of open and close punctuation characters can be displayed on one virtual key, e.g., both {and } are displayed on one virtual key, or both { } and [ ] are displayed on the same virtual key.

[0257] Having one virtual key for multiple pairs of open and close punctuation characters saves space and makes the improved keyboard more suitable for portable multifunction devices. Further, the methods and systems in accordance with embodiments described herein not only require fewer keys, but also reduce the cognitive burden on a user, e.g., the user only needs to remember one punctuation key for all punctuation entries and the user can locate an intended punctuation character through fewer inputs, thus producing a more efficient human-machine interface. For battery-operated devices, a more efficient input mechanism also requires less computing resources, thereby increasing the battery life of the device.

[0258] Having provided the punctuation character key, the device displays (**410**) editable content on the display and detects (**412**) a first input selecting the key. In response to detecting the first input selecting the key, the device determines (**414**) whether to insert an open or a close punctuation character. In accordance with a determination that an open punctuation character is to be inserted, the device displays (**416**) in the editable content the open punctuation character of the at least one pair of open and close punctuation characters, displays an insertion marker after the open punctuation character, and displays a close punctuation character adjacent the insertion marker opposite to the open punctuation character. In accordance with a determination to insert the close punctuation character, the device displays (**418**) the close punctuation character in the editable content on the display.

[0259] For example, in FIG. **5**A, editable content **500** is displayed on the touch screen display **112** with an insertion marker **522** placed behind the phrase "Four score and seven." In FIG. **5**B, the device **100** detects an input **524-1** selecting the punctuation character key **378** labeled with both { } and [ ]. In response to detecting the input **524-1** and based on a determination to insert an open punctuation character, the device **100** displays the open bracket [**511** followed by an insertion marker **522**, and a close bracket] **533-1** adjacent the insertion marker **522**, opposite to the open bracket [**511**.

[0260] In some embodiments, the close punctuation character displayed adjacent the insertion marker **522** and opposite to the open bracket is a ghost image of the close punctuation character to indicate a proposed placement of the close punctuation character into the editable content and to indicate that the close punctuation character has not been

entered into the editable content yet. For example, in FIGS. **5**B-**5**C, the displayed close bracket] has a different appearance from the open bracket [**511**, e.g., the ghost image is displayed in lighter color. The display of the ghost image indicates a possible placement of the close bracket] and indicates that the close bracket] has not been inserted into the editable content yet, and will not be inserted until the device **100** receives another input **524-2** (FIG. **5**D) on the punctuation character key **378**, after which an actual close punctuation character replaces the ghost image at the position of the ghost image when the key **378** is pressed. As shown in FIGS. **5**C and **5**D, after entering notes "today we'd say eighty-seven" after the open bracket [**511**, the lighter colored close bracket] **533-1** is placed after the word "eighty-seven" to indicate a possible placement of the close bracket, and the ghost image is replaced by the real close bracket **533-2** after the word "eighty-seven" in response to the press **524-2** on the punctuation character key **378**. The replacement close bracket] **533-2** has the same appearance as the open bracket [**511**.

[0261] Referring back to method **400**, in FIG. **4**B, in some embodiments, determining whether to insert the open or the close punctuation character includes (**420**) automatically determining whether to insert the open or close punctuation character based on context. In some embodiments, the context includes (**422**) a count of open and/or close punctuation characters in the editable content. In some embodiments, the context includes (**424**) a last entered punctuation character of a same type in the editable content. In some embodiments, the context includes (**426**) a second input detected substantially simultaneously with the first input.

[0262] For example, in FIG. **5**B, in response to the press **524-1** on the punctuation character key **378**, based on a count of zero open brackets and/or a count of zero close brackets in the editable content **500**, the device automatically determines that the open bracket **511** should be inserted into the editable content **500**. Subsequently, in FIG. **5**D, in response to the press **524-2** on the punctuation character key **378**, and based on a count of one open bracket and/or a count of zero close brackets, or based on the last entered bracket being the open bracket **511**, the device automatically determines that the close bracket **533-2** should be inserted into the editable content **500**. Although not shown in FIGS. **5**C-**5**D, in some embodiments, in response to a combination of a function key (e.g., the option key) and the punctuation character key **378**, the device always enters one of the brackets, e.g., the close bracket.

[0263] Automatically determining whether to insert an open or close punctuation character in accordance with embodiments described herein reduces the cognitive burden on a user, thus producing a more efficient human-machine interface. For battery-operated devices, a more efficient input mechanism also requires less computing resources, thereby increasing the battery life of the device.

[0264] Referring back to method **400**, in FIG. **4**B, in some embodiments, determining whether to insert the open or the close punctuation character occurs automatically based on context, including (**428**) the steps: (A) in response to detecting a first deep press as the first input of the key, displaying on the display multiple affordances each associated with a pair of open and close punctuation characters; (B) detecting a second input selecting an affordance from the multiple affordances; and (C) in response to detecting the second input, automatically determining whether to insert the open or the close punctuation character based on context. In some embodiments, the multiple affordances are scrollable (**430**).

[0265] For example, in FIG. **5**E, the device detects a deep press **524-3** as a first input on the punctuation character key **378**, such that the contact intensity exceeds the deep press threshold ITS (as shown in intensity diagram **506**). In response to detecting the deep press **524-3**, the device displays multiple affordances **540-544**, each associated with a pair of open and close punctuation characters. In some embodiments, the multiple affordances **540-544** are contained in a list of scrollable punctuation characters, and at least part of the list is displayed on the touch screen **112** overlaying the editable content **500**. In some embodiments, the overlay is translucent to partially display the editable content **500**. In some embodiments, the list also includes other non-paired characters, such as ~, \, | etc., and is ordered such that the most frequently used punctuation characters are listed first and less frequently used characters can be displayed by scrolling through the list. In some embodiments, the frequency of the characters used is continually updated based on the user's actual usage.

[0266] Although FIG. **5**E illustrates displaying a strip of punctuation characters at the bottom of the touch screen **112** in response to a deep press **524-3** on the punctuation character key **378**, in some embodiments, other keys can be used to bring up a list of other punctuation characters. For example, as described in greater detail below, a multifunctional emoji key can provide a list of emoji characters and other special characters including punctuation characters for selection, thus allowing a user to write with the full range of characters. Further, in some embodiments, the punctuation character list is displayed automatically. For example, in response to detecting that the insertion marker is located adjacently behind a word in a sentence for a predetermined period of time, the device automatically displays the list of the punctuation characters to facilitate editing of the content.

[0267] Providing a list of punctuation characters for selection in response to a deep press on a dedicated punctuation key allows a single key to be used for a range of character entries. Thus, providing the dedicated punctuation key saves space and reduces the cognitive burden on a user, producing a more efficient human-machine interface and making the improved keyboards and methods described herein suitable for portable multifunction devices. For battery-operated devices, a more efficient input mechanism also requires less computing resources, thereby increasing the battery life of the device.

[0268] In some embodiments, as shown in FIG. **5**E and further illustrated in FIGS. **5**F and **5**G, one pair of open/close brackets [ ] is associated with one virtual key **540**, another pair of open/close brackets <<>> is associated with a different virtual key **542**, and a pair of curly brackets { } is associated with yet another virtual key **544**. In both FIGS. **5**F and **5**G, the device detects a second input **524-4** selecting the virtual key **540**, e.g., by a tap **524-4** on the touch screen **112** as shown in FIGS. **5**F-**5**G, or through keyboard arrow key scrolling followed by pressing the return/enter key or spacebar (not shown). In response to detecting the input **524-4**, the device automatically determines whether to insert an open bracket (e.g., FIG. **5**F) or a close bracket (e.g., FIG. **5**G) based on context. In FIG. **5**F, based on a count of zero open brackets and/or a count of zero close brackets in the editable content **500**, or based on no-known last entered bracket, the device inserts the open bracket into the editable content **500**,

while in FIG. **5**G, based on a count of one open bracket and/or a count of zero close brackets in the editable content **500**, or based on an open bracket being the last entered bracket, the device inserts the close bracket into the editable content **500**.

[0269] Referring back to the method **400**, in FIG. **4**C, in some embodiments, determining whether to insert the open or the close punctuation character includes (**432**) the steps: (A) in response to detecting a first deep press as the first input of the key, displaying on the display multiple affordances each associated with a pair of open and close punctuation characters; (B) detecting a second input selecting an affordance from the multiple affordances; (C) in response to detecting the second input, displaying a first affordance associated with an open punctuation character and a second affordance associated with a close punctuation character; (D) detecting a third input selecting one of the first affordance or the second affordance; and (E) displaying in the editable content the open or close punctuation character based on the third input.

[0270] For example, after detecting a deep press **524-3** as a first input on the punctuation character key **378** (e.g., the contact intensity on the key **378** detected by the sensor(s) **374** exceeds a deep press threshold, IT_D), the device displays multiple affordances **540-544**, each associated with a pair of open and close punctuation characters as shown in FIGS. **5**H and **5**I. In FIGS. **5**H-**5**I, the punctuation characters are displayed as a scrollable list in order from the most to least frequently used, e.g., [ ] being more frequently used than <<>> or { } by the user. Further shown in FIGS. **5**H and **5**I, the device detects a second input **524-5** selecting the virtual key **542**, e.g., by a tap, long press, deep press, or a long deep press (e.g., for a duration longer than a predetermined threshold) on the affordance **542** displayed on the touch screen display **112**. Though FIGS. **5**H and **5**I illustrate the second input **524-5** on the touch screen display **112**, in some embodiments, the second input is detected on the physical key **378** (FIG. **5**E). In response to detecting the second input **524-5**, as shown in FIG. **5**I, the device splits the affordance **542** into two affordances by displaying a first affordance **542-1** associated with the open bracket <<and a second affordance **542-2** associated with the close bracket >>. In FIG. **5**I, the device further detects a third input **524-6**, e.g., by tapping on the second affordance **542-2**. In some embodiments, the second input **524-5** and the third input **524-6** are portions of a single input, e.g., while the second input **524-5** remains in contact with the touch screen **112**, sliding the finger to move the contact to the location corresponding to the second affordance **542-2**, and the third input **524-6** corresponds to a lift-off of the contact from the touch screen **112** to select the second affordance **542-2**. In response to selecting the second affordance **542-2** associated with the close bracket >>, the device displays in the editable content **500** the close bracket >>, as shown in FIG. **5**J.

[0271] Splitting one affordance into two affordances for punctuation character entry in response to a deep press allows a single punctuation key to be used for a range of character entries. Thus, providing the dedicated punctuation key saves space and reduces the cognitive burden on a user, thus producing a more efficient human-machine interface and making the improved keyboards and methods described herein suitable for portable multifunction devices. For battery-operated devices, a more efficient input mechanism also requires less computing resources, thereby increasing the battery life of the device.

[0272] Referring back to method **400**, in FIG. **4**C, in some embodiments, the open or close punctuation character is displayed (**434**) in response to detecting one or more additional inputs. In other words, an automatic punctuation character entry based on context can be overwritten by one or more manual punctuation entries.

[0273] For example, in the example shown in FIGS. **5**I-**5**J, the close punctuation character >> can be entered by itself even if the editable content does not contain any prior or paired punctuation character. In another example, a desired punctuation character can be entered through a sequence of key entries including: a first input on a key corresponds to a pair of open and close punctuation characters, a deletion of the punctuation character entered, and a second input on the same key corresponds to the pair of open and close punctuation characters. For example, after [is inserted into the editable content in response to an input on the punctuation character key, a user may want to change the open bracket [to a close bracket]. The user may delete the open bracket [just entered, and select the same punctuation character key immediately after. In response to detecting this key sequence, the device replaces the open bracket [with the close bracket].

[0274] Combining the automated punctuation character entry and manual entry, the methods and systems described herein reduce the cognitive burden on a user, thus producing a more efficient human-machine interface and making the improved keyboards and methods described herein suitable for portable multifunction devices. For battery-operated devices, a more efficient input mechanism also requires less computing resources, thereby increasing the battery life of the device.

[0275] It should be understood that the particular order in which the operations in FIGS. **4**A-**4**C have been described is merely exemplary and is not intended to indicate that the described order is the only order in which the operations could be performed. One of ordinary skill in the art would recognize various ways to reorder the operations described herein. For brevity, these details are not repeated here.

[0276] In accordance with some embodiments, FIG. **6** shows a functional block diagram of a portable multifunction device **600** configured in accordance with the principles of the various described embodiments. The functional blocks of the device are, optionally, implemented by hardware, software, or a combination of hardware and software to carry out the principles of the various described embodiments. It is understood by persons of skill in the art that the functional blocks described in FIG. **6** are, optionally, combined or separated into sub-blocks to implement the principles of the various described embodiments. Therefore, the description herein optionally supports any possible combination or separation or further definition of the functional blocks described herein.

[0277] As shown in FIG. **6**, a portable multifunction device **600** includes a touch-sensitive display unit **602** configured to display user interfaces (editable content on the display unit) and configured to detect touch inputs (contacts), and a processing unit **608** coupled with the touch-sensitive display unit **602**. In some embodiments, processing

unit **608** includes one or more of the following sub-units: detecting unit **610**, displaying unit **612**, and determining unit **614**.

[0278] The processing unit **608** is configured to provide a key on which is depicted at least one pair of punctuation characters (e.g., open and close characters), facilitate the display of editable content on display unit **602**, and detect (e.g., using detecting unit **610**) a first input selecting the key. In some embodiments, processing unit **608** is configured to, in response to detecting (e.g., using detecting unit **610**) the first input selecting the key, determine (e.g., using determining unit **614**) which first punctuation character to insert (e.g., open or close character). The processing unit **608** is further configured to, in accordance with a determination of which first punctuation character to insert, cause the display (e.g., using displaying unit **612**) to display the first punctuation character in the editable content, and, in some embodiments, an insertion marker after the first punctuation character. In some embodiments, the processing unit **608** is also configured to cause the display (e.g., using displaying unit **612**) to display a second punctuation character adjacent the insertion marker and opposite to the first punctuation character. The second punctuation character can be displayed in ghost form, e.g., lighter or in outline as compared to the first punctuation character. The processing unit **608** is further configured to, in accordance with a determination to insert the first and/or second punctuation characters, cause the display (e.g., using displaying unit **612**) of the second punctuation character in the editable content on display unit **602**.

[0279] In some embodiments, the processing unit **608** enables display (e.g., using displaying unit **612**) of both { } and [ ] on the key. In some embodiments, the key is a virtual key displayed on display unit **602**. In some other embodiments, the key is a physical key on a physical keyboard coupled to the electronic device.

[0280] In some embodiments, determining (e.g., using determining unit **614**) whether to insert the first or second (or open or close) punctuation character includes processing unit **608** automatically determining (e.g., using determining unit **614**) whether to insert the first or second (or open or close) punctuation character based on context. In some embodiments, the context includes a count of first and/or second (or open and/or close) punctuation characters in the editable content. In some embodiments, the context includes a last entered punctuation character of a same type in the editable content. In some embodiments, the context includes a second input detected substantially simultaneously with the first input.

[0281] In some embodiments, determining (e.g., using determining unit **614**) whether to insert the first or second (or open or close) punctuation character comprises: processing unit **608**, in response to detecting a first deep press as the first input of the key, enabling display (e.g., using displaying unit **612**) on display unit **602** of multiple affordances each associated with a pair of first or second (or open or close) punctuation character; detecting (e.g., using detecting unit **610**) a second input selecting an affordance from the multiple affordances; and in response to detecting the second input, automatically determining (e.g., using determining unit **614**) whether to insert the first or second (or open or close) punctuation character based on context.

[0282] In some embodiments, determining (e.g., using determining unit **614**) whether to insert the first or second (or open or close) punctuation character comprises: processing unit **608**, in response to detecting a first deep press as the first input of the key, enabling display (e.g., using displaying unit **612**) on display unit **602** of multiple affordances each associated with a pair of first and second (or open and close) punctuation characters, detecting (e.g., using detecting unit **610**) a second input selecting an affordance from the multiple affordances, in response to detecting the second input, enabling display (e.g., using displaying unit **612**) of a first affordance associated with a first (or open) punctuation character and a second affordance associated with a second (or close) punctuation character, detecting (e.g., using detecting unit **610**) a third input selecting one of the first affordance or the second affordance, and enabling display (e.g., using displaying unit **612**) in the editable content of the first or second (or open or close) punctuation character based on the third input.

[0283] In some embodiments, the multiple affordances are scrollable.

[0284] In some embodiments, the processing unit **608** is configured to, in response to detecting one or more additional inputs, enable display of the first or second (or open or close) punctuation character.

[0285] The operations in the information processing methods described above are, optionally implemented by running one or more functional modules in information processing apparatus such as general purpose processors (e.g., as described above with respect to FIGS. **1**A and **3**A-**3**B) or application specific chips.

[0286] The operations described above with reference to FIGS. **4**A-**4**C are, optionally, implemented by components depicted in FIGS. **1**A-**1**B or FIG. **6**. For example, detecting operations **610**, displaying operations **612**, and determining operations **614** are, optionally, implemented by event sorter **170**, event recognizer **180**, and event handler **190**. Event monitor **171** in event sorter **170** detects a contact on touch-sensitive display **112**, and event dispatcher module **174** delivers the event information to application **136-1**. A respective event recognizer **180** of application **136-1** compares the event information to respective event definitions **186**, and determines whether a first contact at a first location on the touch-sensitive surface corresponds to a predefined event or sub-event, such as selection of an object on a user interface. When a respective predefined event or sub-event is detected, event recognizer **180** activates an event handler **190** associated with the detection of the event or sub-event. Event handler **190** optionally utilizes or calls data updater **176** or object updater **177** to update the application internal state **192**. In some embodiments, event handler **190** accesses a respective GUI updater **178** to update what is displayed by the application. Similarly, it would be clear to a person having ordinary skill in the art how other processes can be implemented based on the components depicted in FIGS. **1**A-**1**B.

[0287] Emoji Key

[0288] FIG. **7** is a flow chart illustrating a method **700** of character entry, in accordance with some embodiments. FIGS. **8**A-**8**F, which illustrate exemplary user interfaces for emoji and punctuation character entry, are used to illustrate the processes in FIG. **7**. The method **700** is performed at a portable multifunction device (e.g., the device **100** in FIG. **1**A) with a touch-sensitive display (e.g., the touch screen display **112** in FIG. **1**A) and a physical keyboard (e.g., the physical keyboard **370** in FIG. **3**B) removably couple to the

portable multifunction device. The physical keyboard contains at least one sensor (e.g., the sensors **374** in FIG. **3**B) for detecting contact intensities of inputs on keys of the physical keyboard. As explained above in connection with FIG. **3**B, in some embodiments, the keyboard **370** is communicatively coupled to the portable multifunction device **100** by one or more electrical contacts (e.g., Smart Connect from Apple Computer, Inc. of Cupertino, Calif.), via a wired connection (e.g., USB, PS/2), or via a wireless communication link (e.g., optical, Bluetooth, Wi-Fi, or the like). In some embodiments, as shown in FIGS. **8**A-**8**E, the device **100** provides a physical multifunction emoji key **802** on the physical keyboard **370**.

[0289] As described below, the method **700** provides an efficient mechanism for entering emoji and punctuation characters at a portable multifunction device. This method is faster and easier to perform than conventional emoji and punctuation character entry methods and systems, e.g., conventional character entry through a conventional keyboard with multiple keys and key entries for entering desired emoji and/or punctuation characters. The method is also intuitive for users, thereby reducing the cognitive burden on the user, and creating a more efficient human-machine interface. A more efficient input mechanism also requires less computing resources, thereby increasing battery life of the device.

[0290] The device **100** detects (**702**) an input on a key of the physical keyboard and determines (**704**) if the input is of a first type or a second type distinct from the first type. In some embodiments, the first and second types are (**706**) a tap, press-and-hold, or a deep press on the key of the physical keyboard. For example, in FIG. **8**A, an input **824-1** is detected on the emoji key **802** of the physical keyboard **370**, the device **100** determines that the input **824-1** is a tap and classifies the input as a first type. In FIG. **8**D, a different input **824-2** is detected on the emoji key **802** and the device **100** determines that the input **824-2** is a second type, e.g., press-and-hold or deep press.

[0291] Upon determining that the input is of the first type, the device displays (**708**) a first set of characters associated with the key for selection, and upon determining that the input is of the second type, the device displays (**710**) a second set of characters associated with the key for selection.

[0292] For example, in FIG. **8**A, in response to determining that the input **824-1** on the emoji key **802** is the first type (e.g., tap) of input, a first set of characters **804-1 66** including common emojis is displayed for user selection. In another example, in FIG. **8**D, in response to determining that the input **824-2** on the emoji key **802** is the second type (e.g., press-and-hold or deep press), a different set of characters **804-2** including less common or less frequently used characters is displayed for user selection. In some embodiments, the set of characters for display is personalized such that the commonly used emoji characters are determined based on the usage of a user of the device **100**. In some embodiments, instead of an emoji key, any other suitable key can be provided. For example, in some embodiments, a general punctuation key is provided. The punctuation key is configured to receive two different types of inputs, in response to which the device will display two different associated sets of characters, e.g., different sets of punctuation characters.

[0293] Referring back to FIG. **7**, in some embodiments, the first or the second set of characters is scrollable (**712**) using an arrow key on the physical keyboard. For example, in FIG. **8**A, the device displays a smiley face emoji character **806-1** that is larger than other characters in the scrollable list of emoji characters. The larger size indicates that the smiley face character **806-1** can be entered into the editable content **800** in response to a selection input, e.g., a keyboard return key entry. In some embodiments, the set of emoji characters can be scrolled using the arrow keys and/or by receiving additional inputs (e.g., taps) on the emoji key **802**. In FIG. **8**B, in some embodiments, in response to one or more inputs **826** on the right arrow key, the device displays and highlights a different emoji character **806-2** (e.g., by displaying it larger than the other characters in the scrollable list) indicating that the character **806-2** can be entered into the editable content **800** in response to a selection input, e.g., a keyboard return key entry **828** as shown in FIG. **8**C.

[0294] Though FIGS. **8**A-**8**C illustrate scrolling and selecting the emoji characters using keyboard entries, alternatively, the user can reach up to the touch screen display **112** to scroll and select through touch screen entries. By using all keyboard entries, though, a user can use the portable multifunction device **100** without reaching up from the keyboard.

[0295] In some embodiments, the key of the physical keyboard is multi-functional (**714**) so that a user can enter a full range of characters. An arrow key of the physical keyboard allows the device to switch from one function of the multi-functional key to a different function, and the content displayed in the first or second set of characters is determined based on a function of the multi-functional key. In some embodiments, the first and second set of characters are (**716**) emoji characters when the selection of the key is associated with a first function, and the first and second set of characters are punctuation characters when the selection of the key is associated with a second function. For example, the emoji key **802** in FIG. **8**D can be associated with both emoji and punctuation character entry functions, such that the same key can be used for both emoji and punctuation character entry. For example, after the key **802** was previously pressed and the set of emoji characters **804-2** was displayed for selection (FIG. **8**D), in response to detecting an input **830** on the up or down arrow key on the keyboard (FIG. **8**E), the device switches the function of the key **802** from emoji to punctuation character entry and displays a set of punctuation characters **804-3** for selection (FIG. **8**E). In some embodiments, instead of using the arrow key to switch from one function of the multifunction key **802** to another function of the multifunction key **802**, a configurable key combination is used. For example, a combination of the shift key and the multifunction key **802** can activate a different function of the multifunction key **802**. As another example, the up/down arrow key can change display from one set of emoji characters to a different set of emoji characters with different colors, emotions, etc.

[0296] Having a multi-functional key for both emoji and punctuation characters entry saves space and reduces the size of the physical keyboard. Further, switching from one function of the key to another function of key using an arrow key (e.g., an up arrow key) provides an efficient way of selecting the desired function for character entry. Methods and systems described herein thus provide faster and easier emoji and punctuation character entry than conventional methods and systems, e.g., conventional emoji and punctuation character entry through a conventional keyboard with multi keys and key entries for entering desired emoji or

punctuation characters. Further, allowing the user to toggle different functions of the multifunction key using the arrow key is intuitive for users, thereby reducing the cognitive burden on the user, and creating a more efficient human-machine interface. A more efficient input mechanism also requires less computing resources, thereby increasing battery life of the device.

[0297] Referring back to FIG. **7**, in some embodiments, the physical keyboard is (**718**) decoupled from the portable multifunction device and connected to an electronic device. For example, the physical keyboard **370** as shown in FIG. **3**B and FIGS. **8**A-**8**F can be connected to a different electronic device that does not have a touch screen. When connecting to a different electronic device that does not have a touch screen, the multifunction keys on the physical keyboard **370** provide expanded functions, e.g., entry of emoji and punctuation characters without resorting to other input methods and devices.

[0298] In some embodiments, the device further receives (**720**) a second input on the key to cease the display of the first or the second set of characters. For example, in FIG. **8**F, the device receives a second input **832** on the emoji key **802**. In response to detecting the second input **832**, the device dismisses the punctuation or emoji character entry list **804**. Alternatively, in other embodiments, subsequent inputs of the emoji key **802** causes the device **100** to scroll through the different characters displayed on the screen.

[0299] It should be understood that the particular order in which the operations in FIG. **7** have been described is merely exemplary and is not intended to indicate that the described order is the only order in which the operations could be performed. One of ordinary skill in the art would recognize various ways to reorder the operations described herein. For brevity, these details are not repeated here.

[0300] In accordance with some embodiments, FIG. **9** shows a functional block diagram of a portable multifunction device **900** configured in accordance with the principles of the various described embodiments. The functional blocks of the device are, optionally, implemented by hardware, software, or a combination of hardware and software to carry out the principles of the various described embodiments. It is understood by persons of skill in the art that the functional blocks described in FIG. **9** are, optionally, combined or separated into sub-blocks to implement the principles of the various described embodiments. Therefore, the description herein optionally supports any possible combination or separation or further definition of the functional blocks described herein.

[0301] As shown in FIG. **9**, a portable multifunction device **900** includes a touch-sensitive display unit **902** configured to display user interfaces (editable content on the display unit) and configured to detect touch inputs (contacts), and a processing unit **908** coupled with the touch-sensitive display unit **902**. In some embodiments, the portable multifunction device includes one or more sensor units **904** and the processing unit **908** is coupled with the touch-sensitive display unit **902** and the one or more sensor units **904**. In some embodiments, processing unit **908** includes one or more of the following sub-units: detecting unit **910**, determining unit **912**, displaying unit **914**, and receiving unit **916**. In some embodiments, the portable multifunction device **900** is removably coupled to a physical keyboard unit **906** (e.g., the physical keyboard **370**), which further includes one or more sensor units **907** (e.g., the sensors **374**, FIG. **3**B).

[0302] The processing unit **908** is configured to detect (e.g., with the detecting unit **910**) an input on a key of the physical keyboard unit **906**. The processing unit **908** is configured to determine (e.g., with the determining unit **912**) if the input is of a first type or a second type distinct from the first type. Upon determining that the input is of the first type, the processing unit **908** is configured to display (e.g., with the displaying unit **914**) a first set of characters associated with the key for selection. Upon determining that the input is of the second type, the processing unit **908** is configured to display (e.g., with the displaying unit **914**) a second set of characters associated with the key for selection.

[0303] In some embodiments, the first or the second type is a tap, press-and-hold, or deep press (e.g., detected with the one or more sensor units **907**) on the key of the physical keyboard unit **906**.

[0304] The processing unit **908** is further configured to receive (e.g., with the receiving unit **916**) a second input on the key to cease the display of the first or the second set of characters.

[0305] In some embodiments, the first or the second set of characters is scrollable using an arrow key on the physical keyboard unit **906**.

[0306] In some embodiments, the key of the physical keyboard unit **906** is multi-functional; an arrow key of the physical keyboard unit **906** switches from a function of the multi-functional key to a different function of the multi-functional key; and content of the first set or the second set of characters is determined based on a function of the multi-functional key.

[0307] In some embodiments, the first and second set of characters are emoji characters when the key is associated with a first function, and the first and second set of characters are punctuation characters when the key is associated with a second function.

[0308] In some embodiments, the physical keyboard unit **906** is decoupled from the portable multifunction device and connected to an electronic device.

[0309] The operations in the information processing methods described above are, optionally implemented by running one or more functional modules in information processing apparatus such as general purpose processors (e.g., as described above with respect to FIGS. **1**A and **3**A-**3**B) or application specific chips.

[0310] The operations described above with reference to FIGS. **8**A-**8**F are, optionally, implemented by components depicted in FIGS. **1**A-**1**B or FIG. **9**. For example, detection operation **910**, determining operation **912**, displaying operation **914**, and receiving operation **916** are, optionally, implemented by event sorter **170**, event recognizer **180**, and event handler **190**. Event monitor **171** in event sorter **170** detects a contact on touch-sensitive display **112**, and event dispatcher module **174** delivers the event information to application **136-1**. A respective event recognizer **180** of application **136-1** compares the event information to respective event definitions **186**, and determines whether a first contact at a first location on the touch-sensitive surface corresponds to a predefined event or sub-event, such as selection of an object on a user interface. When a respective predefined event or sub-event is detected, event recognizer **180** acti-

vates an event handler **190** associated with the detection of the event or sub-event. Event handler **190** optionally utilizes or calls data updater **176** or object updater **177** to update the application internal state **192**. In some embodiments, event handler **190** accesses a respective GUI updater **178** to update what is displayed by the application. Similarly, it would be clear to a person having ordinary skill in the art how other processes can be implemented based on the components depicted in FIGS. **1**A-**1**B.

[0311] Currency Key

[0312] FIGS. **10**A-**10**B are flow charts illustrating a method **1000** of currency character entry, in accordance with some embodiments. FIGS. **11**A-**11**H, which illustrate exemplary user interfaces for currency character entry, are used to illustrate the processes in FIGS. **10**A-**10**B. The method **1000** is performed (**1002**) at a portable multifunction device (e.g., the device **100** in FIG. **1**A) with a touch-sensitive display (e.g., the touch screen display **112** in FIG. **1**A) and a physical keyboard (e.g., the physical keyboard **370** in FIG. **3**B) removably coupled to the portable multifunction device. The physical keyboard contains at least one sensor (e.g., the sensor **374**, FIG. **3**B) for detecting contact intensities of inputs on keys of the physical keyboard. As explained above in connection with FIG. **3**B, in some embodiments, the keyboard **370** is communicatively coupled to the portable multifunction device **100** by one or more contacts (e.g., Smart Connect from Apple Computer, Inc. of Cupertino, Calif.), via a wired connection (e.g., USB, PS/2), or via a wireless communication link (e.g., optical, Bluetooth, Wi-Fi, or the like). In some embodiments, the physical keyboard is (**1004**) decoupled from the portable multifunction device and connected to an electronic device. For example, the physical keyboard **370**, as shown in FIG. **3**B and FIGS. **11**A-**11**H can be connected to a different electronic device that does not have a touch screen. When connecting to a different electronic device that does not have a touch screen, the multifunction keys on the physical keyboard **370** provide expanded functions, e.g., entering currency symbols and performing currency conversion without the user resorting to other input methods and devices. In some embodiments, as shown in FIGS. **11**A-**11**H, the device **100** provides a physical multifunction currency key **1102**. This physical multifunction currency key **1102** can be shared or dedicated, i.e., associated with only a currency function.

[0313] As described below, the method **1000** provides an efficient mechanism for currency functionality, such as automatic currency conversion and automatically selecting a local currency symbol, at a portable multifunction device. This method is faster and easier to perform than conventional currency entry methods and systems, e.g., conventional character entry through a conventional keyboard with multiple entries required to locate a local currency symbol and/or convert currency including a manual lookup of the appropriate currency conversion rate. The method is also intuitive for users, thereby reducing the cognitive burden on the user, and creating a more efficient human-machine interface. A more efficient input mechanism also requires less computing resources, thereby increasing battery life of the device.

[0314] The device **100** detects (**1006**) an input on the dedicated or shared currency key of the physical keyboard. For example, in FIG. **11**A, the device detects an input **1124-1** on the dedicated physical currency key **1102** of the physical keyboard **370**.

[0315] In response to receiving the input, the device determines (**1008**) if the input is of a first type or a different second type. In some embodiments, the first or the second type is (**1010**) a tap, press-and-hold (e.g., by measuring the duration of the press and comparing with a predetermined duration threshold), or deep press (e.g., by measuring the contact intensities of the press using the at least one contact intensity sensor contained in the physical keyboard **370** and comparing with a predetermined threshold, IT_D) on the key of the physical keyboard. An example is shown in FIG. **11**A, which shows an input **1124-1** detected on the currency key **1102** of the physical keyboard **370** in conjunction with an input **1124-5** on the shift key. The device **100** determines that the input **1124-1** is a tap and classifies the input as a first type. In FIG. **11**C, a different input **1124-2** is detected on the currency key **1102** and the device **100** determines that the input **1124-2** is a second type, e.g., press-and-hold or deep press.

[0316] Determining whether an input is, for example, a simple tap or a press-and-hold and accordingly providing different currency character entry is an efficient way of entering currency symbols and performing automated currency conversion. Methods and systems described herein are faster and easier to use than conventional currency entry methods and systems, e.g., conventional character entry through a conventional keyboard with multiple entries for entering currency appropriate for the context and manual lookup of a currency conversion rate. Further, providing a list of alternative currency symbols for selection reduces the cognitive burden on the user, and creates a more efficient human-machine interface. A more efficient input mechanism also requires less computing resources, thereby increasing battery life of the device.

[0317] Upon determining that the input is of the first type, the device inserts (**1012**) a currency symbol based on a location of the portable multifunction device. In some embodiments, the currency symbol represents (**1014**) a local currency used at the location. For example, in FIGS. **11**A-**11**B, the portable multifunction device **100** may be located near Mount Fuji. In response to the input **1124-1** being a tap, the device inserts a Japanese Yen symbol ¥, which represents the local currency used at Mount Fuji.

[0318] In some embodiments, the device determines the location of the portable multifunction device using data retrieved from GPS module **136**, or the location associated with the global/public IP address assigned to the device. In some embodiments, the device determines the location of the portable multifunction device using keywords in the editable text, e.g., based on the text "Mount Fuji" in the editable content. The device further determines, e.g., based on information stored locally on the device or retrieved from a remote source that Yen is used as a local currency. In another embodiment, the device determines the type of currency to be converted into based on the context. For example, the device determines that surrounding text mentions Mount Fuji, which is in Japan, and as such it is likely that the conversion should be into Yen.

[0319] Upon determining that the input is of the second type, the device displays (**1016**) a set of different currency characters on the display for selection, wherein upon a selection of a currency character in the set of different currency characters, a numerical value associated with a first currency displayed on the display is converted from the first currency to a second currency corresponding to the selected

currency character. In some embodiments, the set of different currency characters includes (**1018**) a currency character used in a home location and commonly used currencies. In some embodiments, the set of different currency characters is displayed (**1020**) as a scrollable list navigable using an arrow key on the physical keyboard. In some embodiments, the numerical value associated with the first currency displayed on the display is converted (**1022**) from the first currency to the second currency corresponding to the selected currency character using a conversion rate obtained from a remote and/or local source.

[0320] For example, in FIG. **11**C, a set of different currency characters **1104** is displayed on the touch screen **112** in response to detecting the input **1124-2** on the currency key **1102**. The set of currency characters **1104** includes a currency character used in the United States, e.g., $, that is determined to be the local currency used in a home location of the device **100**. Further, commonly used currency characters such as the Pound sign £ and the Euro sign € are displayed. In some embodiments, the set of currency characters for display is personalized such that the commonly used currency characters are determined based on the usage on the device **100**, e.g., the characters ₩, ₪, ¢, ﷼ in the set **1104** are the currency characters most often used by the user of the device **100**. In some embodiments, as shown in FIG. **11**C, the device determines that the numerical value **11800** is associated with the Yen symbol ¥. In FIG. **11**D, the device responds to an input on the return key by selecting the $ symbol and uses a conversion rate obtained from a local and/or remote source to convert ¥11800 to $150. In some embodiments, the device periodically retrieves a set of currency conversion rates from a remote server and stores the set of currency conversion rates on a local repository of the portable multifunction device, so that the data can be retrieved faster locally when needed. In some embodiments, the device detects a network connection of the portable multifunction device of sufficient speed and retrieves the currency conversion rate from a remote source when a currency symbol is selected. In some embodiments, the currency conversion rate can be looked up on the remote source based on location(s) and/or currency symbol(s). For example, in FIG. **11**D, the GPS data obtained from the portable multifunction device can be transmitted along with the selected symbol $ to a remote server for retrieval of a conversion rate between Yen and US Dollars. Alternatively, the combination of ¥ and the selected symbol $ may be transmitted to the remote server for the conversion rate lookup. As another alternative, the location obtained from the editable content (e.g., Mount Fuji) and the selected symbol $ may be transmitted to the remote server for the conversion rate lookup.

[0321] Referring back to method **1000**, in FIG. **10**B, in some embodiments, prior to detecting the input, the device receives (**1024**) a selection of a second numerical value displayed on the display, where the second numerical value is not associated with any currency. Upon determining that the input is of the first type, the device reformats the second numerical value based on the location of the portable multifunction device; and upon determining that the input is of the second type, the device reformats the second numerical value using the selected currency character.

[0322] For example, in FIG. **11**E, a numerical value **115** is displayed in the editable content **1100** that is not associated with any currency symbol. The user selects the numerical value "115", as indicated by the selection indicators **1126**, **1128** and **1130**. The device then detects an input **1124-3**, e.g., a tap on the currency key **1102**. In response to detecting the tap input **1124-3** that is of the first type, the device determines that the device is located in Japan and that the local currency for Japan is ¥. In accordance with the determination, the device reformats the numerical value "115" by adding a ¥ symbol in front of the numerical value, as shown in FIG. **11**F. On the other hand, as shown in FIG. **11**G, in response to detecting a deep press or press-and-hold input **1124-3** on the currency key **1102** while the numerical value "115" is selected, the device displays a list of currency symbols for selection. In FIG. **11**H, responsive to an input on the return key to select the $ symbol, the device inserts a $ symbol in front of the numerical value.

[0323] Automated currency conversion based on a location or context of the device provides an efficient way of entering appropriate currency symbols. Methods and systems described herein are faster and easier to use than conventional currency entry methods and systems, e.g., conventional character entry through a conventional keyboard with multiple entries for entering currency appropriate for the context and manual lookup of the currency conversion rate. Thus, such methods and systems reduce the cognitive burden on the user, and create a more efficient human-machine interface. A more efficient input mechanism also requires less computing resources, thereby increasing battery life of the device. It should be understood that the particular order in which the operations in

[0324] FIGS. **10**A-**10**B have been described is merely exemplary and is not intended to indicate that the described order is the only order in which the operations could be performed. One of ordinary skill in the art would recognize various ways to reorder the operations described herein. For brevity, these details are not repeated here.

[0325] In accordance with some embodiments, FIG. **12** shows a functional block diagram of a portable multifunction device **1200** configured in accordance with the principles of the various described embodiments. The functional blocks of the device are, optionally, implemented by hardware, software, or a combination of hardware and software to carry out the principles of the various described embodiments. It is understood by persons of skill in the art that the functional blocks described in FIG. **12** are, optionally, combined or separated into sub-blocks to implement the principles of the various described embodiments. Therefore, the description herein optionally supports any possible combination or separation or further definition of the functional blocks described herein.

[0326] As shown in FIG. **12**, a portable multifunction device **1200** includes a touch-sensitive display unit **1202** configured to display user interfaces (editable content on the display unit) and configured to detect touch inputs (contacts), and a processing unit **1208** coupled with the touch-sensitive display unit **1202**. In some embodiments, the portable multifunction device includes one or more sensor units **1204** and the processing unit **1208** is coupled with the touch-sensitive display unit **1202** and the one or more sensor units **1204**. In some embodiments, processing unit **1208** includes one or more of the following sub-units: displaying unit **1210**, detecting unit **1212**, determining unit **1214**, converting unit **1216**, and reformatting unit **1216**. In some embodiments, the portable multifunction device **1200** is removably coupled to a physical keyboard unit **1206** (e.g.,

the physical keyboard **370**), which further includes one or more sensor units **1207** (e.g., the sensors **374**, FIG. **3**B).

[0327] The processing unit **1208** is configured to detect (e.g., with the detecting unit **1212**) an input on a dedicated currency key of the physical keyboard unit. The processing unit **1208** is further configured to determine (e.g., with the determining unit **1214**) if the input is of a first type or a different second type. Upon determining that the input is of the first type, the processing unit **1208** is configured to insert (e.g., with the displaying unit **1210**) a currency symbol based on a location of the portable multifunction device. On the other hand, upon determining that the input is of the second type, the processing unit **1208** is configured to display (e.g., with the displaying unit **1210**) a set of different currency characters on the display unit **1202** for selection, where upon a selection of a currency character in the set of different currency characters, a numerical value associated with a first currency displayed on the display is converted from the first currency to a second currency corresponding to the selected currency character.

[0328] In some embodiments, the physical keyboard unit is decoupled from the portable multifunction device and connected to an electronic device.

[0329] In some embodiments, the first or the second type is a tap, press-and-hold, or deep press on the dedicated currency key of the physical keyboard unit.

[0330] In some embodiments, the currency symbol represents a local currency used at the location.

[0331] In some embodiments, the set of different currency characters includes a currency character used in a home location and commonly used currencies.

[0332] In some embodiments, the set of different currency characters is displayed as a scrollable list navigable using an arrow key on the physical keyboard unit.

[0333] In some embodiments, the numerical value associated with the first currency displayed on the display is converted from the first currency to the second currency corresponding to the selected currency character using a conversion rate obtained from a remote and/or local source.

[0334] In some embodiments, the processing unit **1208** is further configured to, prior to detecting the input, receive a selection of a second numerical value displayed on the display unit, the second numerical value is not associated with any currency. Upon determining that the input is of the first type, the processing unit **1208** is configured to reformat (e.g., with the reformatting unit **1218**) the second numerical value based on the location of the portable multifunction device; and upon determining that the input is of the second type, the processing unit **1208** is configured to reformat (e.g., with the reformatting unit **1218**) the second numerical value using the selected currency character.

[0335] The operations in the information processing methods described above are, optionally implemented by running one or more functional modules in information processing apparatus such as general purpose processors (e.g., as described above with respect to FIGS. **1**A and **3**A-**3**B) or application specific chips.

[0336] The operations described above with reference to FIGS. **11**A-**11**H are, optionally, implemented by components depicted in FIGS. **1**A-**1**B or FIG. **12**. For example, displaying operation **1210**, detecting operation **1212**, determining operation **1214**, converting operation **1216**, and reformatting operation **1218** are, optionally, implemented by event sorter **170**, event recognizer **180**, and event handler **190**. Event monitor **171** in event sorter **170** detects a contact on touch-sensitive display **112**, and event dispatcher module **174** delivers the event information to application **136-1**. A respective event recognizer **180** of application **136-1** compares the event information to respective event definitions **186**, and determines whether a first contact at a first location on the touch-sensitive surface corresponds to a predefined event or sub-event, such as selection of an object on a user interface. When a respective predefined event or sub-event is detected, event recognizer **180** activates an event handler **190** associated with the detection of the event or sub-event. Event handler **190** optionally utilizes or calls data updater **176** or object updater **177** to update the application internal state **192**. In some embodiments, event handler **190** accesses a respective GUI updater **178** to update what is displayed by the application. Similarly, it would be clear to a person having ordinary skill in the art how other processes can be implemented based on the components depicted in FIGS. **1**A-**1**B.

[0337] Contact Details Key

[0338] FIG. **13** is a flow chart illustrating a method **1300** of contact details entry, in accordance with some embodiments. FIGS. **14**A-**14**E, which illustrate exemplary user interfaces for contact details entry, are used to illustrate the processes in FIG. **13**. The method **1300** is performed (**1302**) at a portable multifunction device (e.g., the device **100** in FIG. **1**A) with a touch-sensitive display (e.g., the touch screen display **112** in FIG. **1**A) and a physical keyboard (e.g., the physical keyboard **370** in FIG. **3**B) removably coupled to the portable multifunction device. As explained above in connection with FIG. **3**B, in some embodiments, the keyboard **370** is communicatively coupled to the portable multifunction device **100** by one or more contacts (e.g., Smart Connect from Apple Computer, Inc. of Cupertino, Calif.), via a wired connection (e.g., USB, PS/2), or via a wireless communication link (e.g., optical, Bluetooth, Wi-Fi, or the like). In some embodiments, the physical keyboard is (**1304**) decoupled from the portable multifunction device and connected to an electronic device. For example, the physical keyboard **370** as shown in FIG. **3**B and FIGS. **14**A-**14**E can be connected to a different electronic device that does not have a touch screen. When connecting to a different electronic device that does not have a touch screen, the multifunction keys on the physical keyboard **370** provide expanded functions, e.g., entering contact details including both physical and electronic entries without the user resorting to other input methods and devices. In some embodiments, as shown in FIGS. **14**A-**14**E, the device **100** provides a physical multifunction contacts key **1402** on the physical keyboard **370**.

[0339] As described below, the method **1300** provides an efficient mechanism for entering contact details, such as addresses, at a portable multifunction device. This method is faster and easier to perform than conventional address entry methods and systems, e.g., conventional address entry through a conventional keyboard with multiple entries for entering contact details appropriate for the context. The method is also intuitive for users, thereby reducing the cognitive burden on the user, and creating a more efficient human-machine interface. A more efficient input mechanism also requires less computing resources, thereby increasing battery life of the device.

[0340] The device **100** displays (**1306**) at least a portion of text on the display, and subsequently detects (**1308**) an input

on a dedicated or shared address key of the physical keyboard. In response to detecting the input, the device automatically suggests (**1310**) one or more contact details based on the portion of text. In some embodiments, the one or more contact details include (**1312**) any details for a contact in a user's contact book, including a phone number, a physical address (**1312**), an email address (**1314**), or an IM address (**1316**), etc.

[0341] For example, in FIG. **14**A, a partial address "v" is entered into the editable content **1400** and displayed on the touch screen **112**. In some embodiments, as shown in FIG. **14**A, the partial address includes a word or a partial word that is closest to the cursor or preceding the cursor. In some embodiments, the partial address is content that has been selected and highlighted using one or more selection indicators. In some embodiments, the partial address does not need to be selected, and the text closest to the cursor is used. The device detects an input **1424-1**, e.g., a tap on the dedicated or shared address key **1402** of the physical keyboard **370**. In response to detecting the input **1424-1**, the device automatically suggests a list of addresses **1410** based on the partial address "v" and displays the list **1410** adjacent (or near) the partial address "v". In FIG. **14**A, entries in the list **1410** comprise contact details that are associated with the partial address "v", including but not limited to an email address "Mike Van Os, mike.os@me.com", a phone entry "Venu, 712-666-3466", a user name for a messenger or other communication medium "Vick Tom, vtom78 skype", and/or a physical address "Vivian, 1 Infinite Loop, Cupertino." Each of these contact details is related to the partial address, e.g., contains the letter "v" as part of the address. In some embodiments, the partial address used for deriving the list of suggested addresses is highlighted after the input on the dedicated address key **1402** to facilitate the editing of the partial address. In some embodiments, while the list of suggested contact details is displayed, further editing of the partial contact details dynamically updates the content of the list, e.g., one or more addresses may be added or removed from the list **1410** or the device may cease to display the list **1410** if the user completes entering the contact details.

[0342] Having a list of contact details based on a partial text entry that includes not only electronic addresses but also physical addresses expands the contact detail entry capacity of the physical keyboard. Conventional physical keyboards often do not provide a contacts key or suggest entering contacts associated with the contacts key. Thus, the method described herein provides an efficient mechanism for entering contact details at a portable multifunction device. By providing a list of suggestions, the method is also intuitive for users, thereby reducing the cognitive burden on the user, and creating a more efficient human-machine interface. A more efficient input mechanism also requires less computing resources, thereby increasing battery life of the device.

[0343] Referring back to FIG. **13**, in some embodiments, automatically suggesting the one or more contact details based on the partial text includes (**1318**) automatically correcting the portion of text. In some embodiments, automatically correcting the portion of text further includes (**1320**) obtaining a subset of characters from the portion of text by removing one or more characters from the portion of text; matching the subset of characters with first contact details in a contact book stored on the portable electronic device; replacing the display of the portion of text with the subset of characters on the display; and highlighting the first contact details among the one or more suggested contact details displayed on the display.

[0344] For example, in FIG. **14**B, a portion of text "vb" is entered into the editable content **1400** and displayed on the touch screen **112**. The device detects an input **1424-2**, e.g., a tap on the dedicated contacts key **1402** of the physical keyboard **370**. In FIG. **14**C, in response to detecting the tap **1424-2**, the device automatically suggests a list of contact details **1410** based on the portion of text "vb" and automatically corrects the portion of text to "v" based on a determination that none of the contacts from a contact book match the portion of text "vb" and one or more of the contacts from the contact book match a subset of the portion of text "vb", e.g. "v". Further, email address "Mike Van Os, mike.os@me.com" in the list **1410** is highlighted to indicate that the email address is the suggested contact in the list **1410**.

[0345] Automatic contact details correction provides an efficient mechanism for entering contact details, such as addresses, and assures that contact details are correctly entered. The method is also intuitive for users, as by pressing the contacts key, the user relies on the electronic device to look up entries in the contact book and suggest the best match, thereby reducing the cognitive burden on the user, and creating a more efficient human-machine interface. A more efficient input mechanism also requires less computing resources, thereby increasing battery life of the device.

[0346] In some embodiments, the list **1410** is scrollable, e.g., using the arrow keys on the keyboard **370** to scroll through and then select an entry in the list using a return key of the keyboard **370**. Referring back to FIG. **13**, the device further receives (**1322**) a selection of a contact detail of the one or more contact details and displays (**1324**) the contact detail on the display. As shown in FIG. **14**D, instead of selecting the suggested first entry in the list **1410**, the user scrolls through the list **1410** by pressing the arrow key. In response to detecting the input **1426** on the arrow key, the device highlights a different entry in the list **1410**. In response to detecting the input **1428** on the return key, as shown in FIG. **14**E, the device displays the selected physical address "Vivian, 1 Infinite Loop, Cupertino" in the editable content **1400**. In some embodiments, once a contact detail is selected and entered into the editable content **1400**, the list **1410** is dismissed.

[0347] It should be understood that the particular order in which the operations in FIG. **13** have been described is merely exemplary and is not intended to indicate that the described order is the only order in which the operations could be performed. One of ordinary skill in the art would recognize various ways to reorder the operations described herein. For brevity, these details are not repeated here.

[0348] In accordance with some embodiments, FIG. **15** shows a functional block diagram of a portable multifunction device **1500** configured in accordance with the principles of the various described embodiments. The functional blocks of the device are, optionally, implemented by hardware, software, or a combination of hardware and software to carry out the principles of the various described embodiments. It is understood by persons of skill in the art that the functional blocks described in FIG. **15** are, optionally, combined or separated into sub-blocks to implement the principles of the various described embodiments. Therefore, the description herein optionally supports any possible combination or separation or further definition of the functional blocks described herein.

[0349] As shown in FIG. **15**, a portable multifunction device **1500** includes a touch-sensitive display unit **1502** configured to display user interfaces (editable content on the display unit) and configured to detect touch inputs (contacts), and a processing unit **1508** coupled with the touch-sensitive display unit **1502**. In some embodiments, the portable multifunction device includes one or more sensor units **1504** and the processing unit **1508** is coupled with the touch-sensitive display unit **1502** and the one or more sensor units **1504**. In some embodiments, processing unit **1508** includes one or more of the following sub-units: displaying unit **1510**, detecting unit **1512**, suggesting unit **1514**, receiving unit **1516**, correcting unit **1518**, obtaining unit **1520**, matching unit **1522**, replacing unit **1524**, highlighting unit **1526**, and removing unit **1528**. In some embodiments, the portable multifunction device **1500** is removably coupled to a physical keyboard unit **1506** (e.g., the physical keyboard **370**), which further includes one or more sensor units **1507** (e.g., the sensors **374**, FIG. **3**B).

[0350] The processing unit **1508** is configured to display (e.g., with the displaying unit **1510**) at least a portion of text on the display. The processing unit **1508** is further configured to detect (e.g., with the detecting unit **1512**) an input on a dedicated contacts key of the physical keyboard unit **1506**. In response to detecting the input, the processing unit **1508** is configured to automatically suggest (e.g., with the suggesting unit **1514**) one or more contact details based on the portion of text. The processing unit **1508** is further configured to receive (e.g., with the receiving unit **1516**) a selection of a contact detail of the one or more contact details; and display (e.g., with the displaying unit **1510**) the contact detail on the display unit **1502**.

[0351] In some embodiments, the physical keyboard unit **1506** is decoupled from the portable multifunction device and connected to an electronic device. In some embodiments, the one or more contact details include a physical address. In some embodiments, the one or more contact details include an email address. In some embodiments, the one or more contact details include an IM address. In some embodiments, automatically suggesting the one or more contact details based on the portion of text includes automatically correcting (e.g., with the correcting unit **1518**) the portion of text.

[0352] In some embodiments, automatically correcting the portion of text includes (a) obtaining (e.g., with the obtaining unit **1520**) a subset of characters from the portion of text by removing (e.g., the removing unit **1528**) one or more characters from the portion of text; (b) matching (e.g., with the matching unit **1522**) the subset of characters with first contact details in a contact book stored on the portable electronic device; (c) replacing (e.g., with the replacing unit **1524**) the display of the portion of text with the subset of characters on the display unit **1502**; and (d) highlighting (e.g., with the highlighting unit **1528**) the first contact details among the one or more suggested contact details displayed on the display unit **1502**.

[0353] The operations in the information processing methods described above are, optionally implemented by running one or more functional modules in information processing apparatus such as general purpose processors (e.g., as described above with respect to FIGS. **1**A and **3**A-**3**B) or application specific chips.

[0354] The operations described above with reference to FIGS. **14**A-**14**E are, optionally, implemented by components depicted in FIGS. **1**A-**1**B or FIG. **15**. For example, displaying operation **1510**, detecting operation **1512**, suggesting operation **1514**, receiving operation **1516**, correcting operation **1518**, obtaining operation **1520**, matching operation **1522**, replacing operation **1524**, highlighting operation **1526**, and removing operation **1528** are, optionally, implemented by event sorter **170**, event recognizer **180**, and event handler **190**. Event monitor **171** in event sorter **170** detects a contact on touch-sensitive display **112**, and event dispatcher module **174** delivers the event information to application **136-1**. A respective event recognizer **180** of application **136-1** compares the event information to respective event definitions **186**, and determines whether a first contact at a first location on the touch-sensitive surface corresponds to a predefined event or sub-event, such as selection of an object on a user interface. When a respective predefined event or sub-event is detected, event recognizer **180** activates an event handler **190** associated with the detection of the event or sub-event. Event handler **190** optionally utilizes or calls data updater **176** or object updater **177** to update the application internal state **192**. In some embodiments, event handler **190** accesses a respective GUI updater **178** to update what is displayed by the application. Similarly, it would be clear to a person having ordinary skill in the art how other processes can be implemented based on the components depicted in FIGS. **1**A-**1**B.

[0355] Dedicated Home Key

[0356] FIGS. **16**A-**16**B are flow charts illustrating a method **1600** of displaying a home screen and a multitasking screen, in accordance with some embodiments. FIGS. **17**A-**17**E, which illustrate exemplary user interfaces for displaying a home screen and a multitasking screen for switching applications, are used to illustrate the processes in FIGS. **16**A-**16**B. The method **1600** is performed (**1602**) at a portable multifunction device (e.g., the device **100** in FIG. **1**A) with a touch-sensitive display (e.g., the touch screen display **112** in FIG. **1**A) and a physical keyboard (e.g., the physical keyboard **370** in FIG. **3**B) removably coupled to the portable multifunction device. The physical keyboard contains at least one sensor (e.g., the sensors **374**, FIG. **3**B) for detecting contact intensities of inputs on keys of the physical keyboard. As explained above in connection with FIG. **3**B, in some embodiments, the keyboard **370** is communicatively coupled to the portable multifunction device **100** by contact (e.g., Smart Connect from Apple Computer, Inc. of Cupertino, Calif.), via a wired connection (e.g., USB, PS/2), or via a wireless communication link (e.g., optical, Bluetooth, Wi-Fi, or the like). In some embodiments, the physical keyboard is (**1604**) decoupled from the portable multifunction device and connected to an electronic device. For example, the physical keyboard **370** as shown in FIG. **3**B and FIGS. **17**A-**17**E can be connected to a different electronic device that does not have a touch screen. When connecting to a different electronic device that does not have a touch screen, the multifunction keys on the physical keyboard **370** provide expanded functions, e.g., displaying a home screen and switching to different open applications without the user resorting to other input methods and devices. In some embodiments, as shown in FIGS. **17**A-**17**E, the device **100** provides a physical multifunction home key **1702** on the physical keyboard **370**.

[0357] As described below, the method **1600** provides an efficient mechanism for displaying a home screen at a portable multifunction device. This method is faster and

easier to perform than conventional methods and systems, e.g., conventional home screen displays and methods of switching applications through a conventional keyboard with multiple keys and multiple key entries. The method is also intuitive for users, thereby reducing the cognitive burden on the user, and creating a more efficient human-machine interface. A more efficient input mechanism also requires less computing resources, thereby increasing battery life of the device.

[0358] The device **100** displays (**1606**) on a display a user interface for an application that is open, and subsequently detects (**1608**) an input on a dedicated home key of the physical keyboard. The device then determines (**1610**) if the input is of a first type or a different second type. In some embodiments, the first type of the input is (**1612**) a tap on the dedicated home key of the physical keyboard, and the second type of the input is a double tap (or a harder or longer press) on the dedicated home key of the physical keyboard. For example, in FIG. **17**A, an input **1724-1** is detected on the home key **1702** of the physical keyboard **370**, the device **100** determines that the input **1724-1** is a tap and classifies the input as a first type. In FIG. **17**B, a different input **1724-2** is detected on the home key **1702** and the device **100** determines that the input **1724-2** is a second type, e.g., double tap.

[0359] In accordance with a determination that the input is the first type, the device displays (**1614**) a home screen on the display. In some embodiments, the user interface, which is displayed before a selection of the home key, corresponds to the open application and is not an interface for the home screen (**1616**). In accordance with the determination that the input is of the first type, the home screen is displayed on the display and the prior user interface is no longer displayed, i.e., only the home screen is displayed on the display.

[0360] For example, in FIG. **17**A, an interface for composing an email is displayed on the display prior to receiving the tap **1724-1** on the dedicated home key **1702**. In response to receiving the tap input **1724-1**, the device ceases to display the email interface and displays the home screen interface on the display, as shown in FIG. **17**B. Although FIG. **17**A illustrates only one open application interface on the display prior to receiving the tap input **1724-1**, when more than one open application windows are concurrently displayed on the display prior to receiving the tap input, in response to receiving the tap input, the device ceases to display all of these open application windows and fills the entire touch screen **112** with the home screen interface.

[0361] Although some portable multifunction devices have a home button for displaying the home screen, conventional keyboards often do not have a dedicated home button. Having a home button on the keyboard, which provides the function of displaying the home screen responsive to a tap, obviates the need for the user to reach up from the keyboard. Thus, the method described herein provides an efficient mechanism for displaying a home screen at a portable multifunction device. This method is faster and easier to perform than conventional methods and systems, e.g., navigating to the home screen using the interface on the portable multifunction device **100**. The method is also intuitive for users, thereby reducing the cognitive burden on the user, and creating a more efficient human-machine interface. A more efficient input mechanism also requires less computing resources, thereby increasing battery life of the device.

[0362] Referring back to the method **1600**, in FIG. **16**A, in accordance with a determination that the input is the second type, the device displays (**1618**) a navigable list of concurrently open applications including the open application on the portable multifunction device. In some embodiments, in accordance with the determination that the input is the second type, displaying the navigable list of concurrently open applications on the portable multifunction device includes (**1620**): (a) reducing the user interface in size to an image, e.g. taking a live snapshot of the user interface and/or obtaining a live thumbnail image of the user interface; (b) obtaining a series of images representing user interfaces of other concurrently open applications; and (c) displaying at least a portion of the image adjacent to and ahead of the series of images to form a scrollable list of images representing the navigable list of concurrently open applications on the portable multifunction device.

[0363] For example, in FIG. **17**B, the home screen interface is displayed at a first size (e.g., full screen size) on the display prior to receiving a double tap input **1724-2** on the dedicated home key **1702**. In response to receiving the double tap input **1724-2**, the device transitions from displaying only the home screen interface to displaying a multitasking interface, as shown in FIG. **17**C.

[0364] In some embodiments, this transition includes first producing a reduced-scale image and then transitioning the home screen into the reduced-scale image, e.g., a live thumbnail image of the home screen. The reduced-scale image is at a second size that is smaller than the first size, e.g., icon sized or an image that is smaller than a full screen size. The device further obtains a series of reduced-scale images that represent user interfaces of other concurrently open applications. For example, in FIG. **17**C, at least two concurrently open applications are executing on the device **100**, one is an email application (e.g., the user interface shown in FIG. **17**A) and another is a browser application (e.g., the user interface shown in FIG. **17**D). In response to the double tap input **1724-2**, the device obtains one live thumbnail image **1710-2** that corresponds to the email application interface shown in FIG. **17**A and obtains another live thumbnail image **1710-3** that corresponds to the web browser interface shown in FIG. **17**D. After obtaining the reduced-scale images, at least a portion of the reduced-scale image of the home screen **1710-1** is displayed in a scrollable list of images **1710**. Adjacent the image **1710-1**, the scrollable list of images **1710** contains other reduced-scale images **1710-2** and **1710-3** that represent user interfaces of other concurrently open applications. Because the home screen interface was in focus prior to receiving the double tap input **1724-2**, the image **1710-1** representing the home screen interface is displayed ahead of other live thumbnail images in the scrollable list **1710**.

[0365] Having a multifunction home button saves space on the physical keyboard. Further, the method described herein is faster and easier to perform than conventional methods and systems, e.g., navigating to the home screen using the interface on the portable multifunction device **100**. In addition, having a home button that provides both the function of displaying the home screen and the function of displaying the multitasking screen is intuitive, thereby reducing the cognitive burden on the user, and creating a more efficient human-machine interface. A more efficient input mechanism also requires less computing resources, thereby increasing battery life of the device.

[0366] Referring back to the method **1600**, in accordance with some embodiments, in FIG. **16**B, the navigable list of concurrently open applications is scrolled (**1622**) in response to receiving an input on an arrow key on the physical keyboard. For example, in FIG. **17**C, the navigable list of concurrently open applications can be scrolled towards the left edge of the display **112** in response to an input or selection **1724-3** of the left arrow key, and scrolled towards the right edge of the display **112** in response to an input or selection **1724-4** of the right arrow key.

[0367] In some embodiments, an active window in the navigable list of concurrently open applications on the portable multifunction device is selected (**1624**) in response to receiving an input on a return or space key on the physical keyboard. For example, in FIG. **17**C, after using the left and/or the right arrow key to scroll the list, the user may use the return key or the space bar on the physical keyboard **370** to select the snapshot (e.g., reduced-scale image of the application) displayed at the center of the display. In response to selecting the third snapshot **1710-3** (FIG. **17**C), the device displays the application user interface (e.g., the browser) on the display **112**, as shown in FIG. **17**D. Subsequently, in response to detecting another double tap **1724-2** on the home key while the interface is displayed, the device replaces the interface with the multitasking screen that includes a series of reduced-scale images **1712** (called snapshots or thumbnail images) corresponding to concurrently open applications (FIG. **17**E). In FIG. **17**E, at least three open applications are executing on the device **100**, namely: a browser application, an email application, and a map application. The live thumbnail image **1712-1** corresponds to the browser application and at least a portion of the image **1712-1** is displayed. The second image **1712-2** corresponding to the email application interface (FIG. **17**A) is displayed adjacent the image **1712-1**. At least a portion of the third image **1712-3** corresponding to the map application interface is displayed adjacent the second image **1712-2**. The scrollable list of images **1712** represents the navigable list of concurrently open applications (e.g., browser, email, and map) on the portable multifunction device.

[0368] In some embodiments, the first image in the scrollable list of images corresponds to the open application that was in focus the input **1724** was detected on the home key **1702**. For example, in FIG. **17**E, because the browser interface was in focus when the input **1724-3** was detected, the reduced-scale image **1712-1** corresponding to the browser application interface is displayed at the left (or in the center) in relation to the other images in the scrollable list **1712**. In comparison, in FIG. **17**C, because the home screen was in focus when the input **1724-2** was detected, the reduced-scale image **1710-1** representing the home screen interface is displayed at the left (or in the center) of other images in the scrollable list **1710**.

[0369] Using the arrow, return, and/or space keys on the keyboard for navigating between the snapshots of the open applications obviates the need for reaching up from the keyboard to navigate and select an application. Thus, the method described herein provides an efficient mechanism for navigating a multitasking screen at a portable multifunction device. This method is both faster and easier to perform than conventional methods and systems. The method is also intuitive for users, thereby reducing the cognitive burden on the user, and creating a more efficient human-machine interface. A more efficient input mechanism also requires less computing resources, thereby increasing battery life of the device.

[0370] It should be understood that the particular order in which the operations in FIGS. **16**A-**16**B have been described is merely exemplary and is not intended to indicate that the described order is the only order in which the operations could be performed. One of ordinary skill in the art would recognize various ways to reorder the operations described herein. For brevity, these details are not repeated here.

[0371] In accordance with some embodiments, FIG. **18** shows a functional block diagram of a portable multifunction device **1800** configured in accordance with the principles of the various described embodiments. The functional blocks of the device are, optionally, implemented by hardware, software, or a combination of hardware and software to carry out the principles of the various described embodiments. It is understood by persons of skill in the art that the functional blocks described in FIG. **18** are, optionally, combined or separated into sub-blocks to implement the principles of the various described embodiments. Therefore, the description herein optionally supports any possible combination or separation or further definition of the functional blocks described herein.

[0372] As shown in FIG. **18**, a portable multifunction device **1800** includes a touch-sensitive display unit **1802** configured to display user interfaces (editable content on the display unit) and configured to detect touch inputs (contacts), and a processing unit **1808** coupled with the touch-sensitive display unit **1802**. In some embodiments, the portable multifunction device includes one or more sensor units **1804** and the processing unit **1808** is coupled with the touch-sensitive display unit **1802** and the one or more sensor units **1804**. In some embodiments, processing unit **1808** includes one or more of the following sub-units: displaying unit **1810**, detecting unit **1812**, determining unit **1814**, reducing unit **1816**, and receiving unit **1818**. In some embodiments, the portable multifunction device **1800** is removably coupled to a physical keyboard unit **1806** (e.g., the physical keyboard **370**), which further includes one or more sensor units **1807** (e.g., the sensors **374**, FIG. **3**B).

[0373] The processing unit **1808** is configured to detect (e.g., with the detecting unit **1812**) an input on a dedicated home key of the physical keyboard unit **1806**. In response to detecting the input, the processing unit **1808** is configured to determine (e.g., with the determining unit **1814**) whether the input is of a first type or a second type. In accordance with a determination that the input is the first type, the processing unit **1808** is configured to display (e.g., with the displaying unit **1810**) a home screen on the display unit **1802**. On the other hand, in accordance with a determination that the input is the second type, the processing unit **1808** is configured to display (e.g., with the displaying unit **1810**) a navigable list of concurrently open applications including the open application on the portable multifunction device.

[0374] In some embodiments, the physical keyboard unit **1806** is decoupled from the portable multifunction device and connected to an electronic device.

[0375] In some embodiments, the first type of the input is a tap on the dedicated home key of the physical keyboard unit **1806**, and the second type of the input is a double tap on the dedicated home key of the physical keyboard unit **1806**.

[0376] In some embodiments, the user interface corresponds to the open application is not an interface for the home screen; and in accordance with the determination that the input is the first type, displaying the home screen on the display unit **1802** includes ceasing to display (e.g., with the displaying unit **1810**) the user interface and displaying only the home screen on the display unit **1802**.

[0377] In some embodiments, in accordance with the determination that the input is the second type, displaying the navigable list of concurrently open applications on the portable multifunction device includes reducing (e.g., with the reducing unit **1816**) the user interface to a smaller size; displaying (e.g., with the displaying unit **1810**) the smaller sized user interface in a predefined area of a series of predefined areas, where the predefined area is in the first place of the series of predefined areas; and displaying snapshots of at least some of the concurrently open applications in remaining predefined areas of the series of predefined areas on the display unit **1802**.

[0378] In some embodiments, the navigable list of concurrently open applications is scrolled in response to receiving an input on an arrow key on the physical keyboard unit **1806**.

[0379] In some embodiments, an active window in the navigable list of concurrently open applications on the portable multifunction device is selected in response to receiving (e.g., with the receiving unit **1818**) an input on a return or space key on the physical keyboard unit **1806**.

[0380] The operations in the information processing methods described above are, optionally implemented by running one or more functional modules in information processing apparatus such as general purpose processors (e.g., as described above with respect to FIGS. **1**A and **3**A-**3**B) or application specific chips.

[0381] The operations described above with reference to FIGS. **17**A-**17**E are, optionally, implemented by components depicted in FIGS. **1**A-**1**B or FIG. **18**. For example, displaying operation **1810**, detecting operation **1812**, determining operation **1814**, and reducing operation **1816** are, optionally, implemented by event sorter **170**, event recognizer **180**, and event handler **190**. Event monitor **171** in event sorter **170** detects a contact on touch-sensitive display **112**, and event dispatcher module **174** delivers the event information to application **136-1**. A respective event recognizer **180** of application **136-1** compares the event information to respective event definitions **186**, and determines whether a first contact at a first location on the touch-sensitive surface corresponds to a predefined event or sub-event, such as selection of an object on a user interface. When a respective predefined event or sub-event is detected, event recognizer **180** activates an event handler **190** associated with the detection of the event or sub-event. Event handler **190** optionally utilizes or calls data updater **176** or object updater **177** to update the application internal state **192**. In some embodiments, event handler **190** accesses a respective GUI updater **178** to update what is displayed by the application. Similarly, it would be clear to a person having ordinary skill in the art how other processes can be implemented based on the components depicted in FIGS. **1**A-**1**B.

[0382] Dedicated Select Key

[0383] FIG. **19** is a flow chart illustrating a method **1900** of content selection using a dedicated select key on a physical keyboard, in accordance with some embodiments. FIGS. **20**A-**20**C, which illustrate exemplary user interfaces for content selection, are used to illustrate the processes in FIG. **19**. The method **1900** is performed (**1902**) at a portable multifunction device (e.g., the device **100** in FIG. **1**A) with a touch-sensitive display (e.g., the touch screen display **112** in FIG. **1**A) and a physical keyboard (e.g., the physical keyboard **370** in FIG. **3**B) removably coupled to the portable multifunction device. As explained above in connection with FIG. **3**B, in some embodiments, the keyboard **370** is communicatively coupled to the portable multifunction device **100** by contact (e.g., Smart Connect from Apple Computer, Inc. of Cupertino, Calif.), via a wired connection (e.g., USB, PS/2), or via a wireless communication link (e.g., optical, Bluetooth, Wi-Fi, or the like). In some embodiments, the physical keyboard is (**1904**) decoupled from the portable multifunction device and connected to an electronic device. For example, the physical keyboard **370** as shown in FIG. **3**B and FIGS. **20**A-**20**C can be connected to a different electronic device that does not have a touch screen. In some embodiments, as shown in FIGS. **20**A-**20**C, the device **100** provides a physical select key **2002** on the physical keyboard **370**.

[0384] As described below, the method **1900** provides an efficient mechanism for content selection at a portable multifunction device. This method is faster and easier to perform than conventional content selection methods and systems, e.g., conventional content selection through a conventional keyboard with multiple key inputs for selecting content. The method is also intuitive for users, thereby reducing the cognitive burden on the user, and creating a more efficient human-machine interface. A more efficient input mechanism also requires less computing resources, thereby increasing battery life of the device.

[0385] The device **100** displays (**1906**) content of an electronic document on the display, and displays (**1908**) a cursor within the electronic document. The device then detects (**1910**) an input on a dedicated select key of the physical keyboard. In response to detecting the input, the device selects (**1912**) a portion of the content in the document closest to the cursor, and displays the portion of the content as selected content on the display.

[0386] In some embodiments, the content comprises (**1914**) editable text, and the portion of the content is a word located closest to the cursor. For example, in FIG. **20**A, an electronic document, e.g., email **2000** is displayed in the email composer. The email content is editable text, including a word "transparent" located closest to the cursor **2022**. The cursor **2022** is displayed in between the character "n" and "s" of the word "transparent". The device detects an input **2024**, e.g., a tap on the dedicated select key **2002**. In response to detecting the input **2024**, the device selects the word "transparent", which was the closest to the cursor prior to the selection. In FIG. **20**B, the word selection is highlighted by the selection indicators **2026**, **2028** and **2030**.

[0387] In some embodiments, the device further detects (**1916**) an additional input on an arrow key of the physical keyboard. In response to detecting the additional input, the device expands the selected content in accordance with a direction associated with the arrow key. For example, in FIG. **20**C, while the content is selected, an input **2023** on the left arrow key expands the selection to include more characters to the left of the word "transparent." Likewise, though not shown in FIG. **20**C, in response to detecting an input on

the right, down, or up arrow key of the physical keyboard **370**, the selected portion expands in accordance with the direction of the arrow key.

[0388] Selecting a word closest to the cursor and providing the ability to adjust (e.g., expand or shrink) the selection using arrow keys is faster and easier to perform than conventional content selection methods and systems. Conventional keyboards often do not have a select button and a user cannot select content without using other input methods. Using the arrow keys for selection adjustment is also intuitive for users, thereby reducing the cognitive burden on the user, and creating a more efficient human-machine interface. A more efficient input mechanism also requires less computing resources, thereby increasing battery life of the device.

[0389] It should be understood that the particular order in which the operations in FIG. **19** have been described is merely exemplary and is not intended to indicate that the described order is the only order in which the operations could be performed. One of ordinary skill in the art would recognize various ways to reorder the operations described herein. For brevity, these details are not repeated here.

[0390] In accordance with some embodiments, FIG. **21** shows a functional block diagram of a portable multifunction device **2100** configured in accordance with the principles of the various described embodiments. The functional blocks of the device are, optionally, implemented by hardware, software, or a combination of hardware and software to carry out the principles of the various described embodiments. It is understood by persons of skill in the art that the functional blocks described in FIG. **21** are, optionally, combined or separated into sub-blocks to implement the principles of the various described embodiments. Therefore, the description herein optionally supports any possible combination or separation or further definition of the functional blocks described herein.

[0391] As shown in FIG. **21**, a portable multifunction device **2100** includes a touch-sensitive display unit **2102** configured to display user interfaces (editable content on the display unit) and configured to detect touch inputs (contacts), and a processing unit **2108** coupled with the touch-sensitive display unit **2102**. In some embodiments, the portable multifunction device includes one or more sensor units **2104** and the processing unit **2108** is coupled with the touch-sensitive display unit **2102** and the one or more sensor units **2104**. In some embodiments, processing unit **2108** includes one or more of the following sub-units: displaying unit **2110**, detecting unit **2112**, selecting unit **2114**, and expanding unit **2116**. In some embodiments, the portable multifunction device **2100** is removably coupled to a physical keyboard unit **2106** (e.g., the physical keyboard **370**), which further includes one or more sensor units **2107** (e.g., the sensors **374**, FIG. **3**B).

[0392] The processing unit **2108** is configured to display (e.g., with the displaying unit **2110**) content of an electronic document on the display unit **2102**. The processing unit **2108** is further configured to display (e.g., with the displaying unit **2110**) a cursor within the electronic document; detect (e.g., with the detecting unit **2112**) an input on a dedicated select key of the physical keyboard unit **2106**. In response to detecting the input, the processing unit **2108** is configured to select (e.g., with the selecting unit **2114**) a portion of the content in the document closest to the cursor; and display (e.g., with the displaying unit **2110**) the portion of the content as selected content on the display unit **2102**.

[0393] In some embodiments, the physical keyboard unit **2106** is decoupled from the portable multifunction device and connected to an electronic device.

[0394] In some embodiments, the content comprises editable text, and the portion of the content is a word located closest to the cursor.

[0395] In some embodiments, the processing unit **2108** is further configured to detect (e.g., with the detecting unit **2112**) an additional input on an arrow key of the physical keyboard unit; and in response to detect the additional input, expand (e.g., with the expanding unit **2116**) the selected content in accordance with a direction associated with the arrow key.

[0396] The operations in the information processing methods described above are, optionally implemented by running one or more functional modules in information processing apparatus such as general purpose processors (e.g., as described above with respect to FIGS. **1**A and **3**A-**3**B) or application specific chips.

[0397] The operations described above with reference to FIGS. **20**A-**20**C are, optionally, implemented by components depicted in FIGS. **1**A-**1**B or FIG. **21**. For example, displaying operation **2110**, detecting operation **2112**, selecting operation **2114**, and expanding operation **2116** are, optionally, implemented by event sorter **170**, event recognizer **180**, and event handler **190**. Event monitor **171** in event sorter **170** detects a contact on touch-sensitive display **112**, and event dispatcher module **174** delivers the event information to application **136-1**. A respective event recognizer **180** of application **136-1** compares the event information to respective event definitions **186**, and determines whether a first contact at a first location on the touch-sensitive surface corresponds to a predefined event or sub-event, such as selection of an object on a user interface. When a respective predefined event or sub-event is detected, event recognizer **180** activates an event handler **190** associated with the detection of the event or sub-event. Event handler **190** optionally utilizes or calls data updater **176** or object updater **177** to update the application internal state **192**. In some embodiments, event handler **190** accesses a respective GUI updater **178** to update what is displayed by the application. Similarly, it would be clear to a person having ordinary skill in the art how other processes can be implemented based on the components depicted in FIGS. **1**A-**1**B.

[0398] Multifunction Tab Key

[0399] FIG. **22** is a flow chart illustrating a method **2200** of using a multifunction tab key, in accordance with some embodiments. FIGS. **23**A-**23**C, which illustrate exemplary user interfaces of using a multifunction tab key, are used to illustrate the processes in FIG. **22**. The method **2200** is performed (**2202**) at a portable multifunction device (e.g., the device **100** in FIG. **1**A) with a touch-sensitive display (e.g., the touch screen display **112** in FIG. **1**A) and a physical keyboard (e.g., the physical keyboard **370** in FIG. **3**B) removably coupled to the portable multifunction device. As explained above in connection with FIG. **3**B, in some embodiments, the keyboard **370** is communicatively coupled to the portable multifunction device **100** by contact (e.g., Smart Connect from Apple Computer, Inc. of Cupertino, Calif.), via a wired connection (e.g., USB, PS/2), or via a wireless communication link (e.g., optical, Bluetooth,

Wi-Fi, or the like). In some embodiments, the physical keyboard is (**2204**) decoupled from the portable multifunction device and connected to an electronic device. For example, the physical keyboard **370** as shown in FIG. **3**B and FIGS. **23**A-**23**C can be connected to a different electronic device that does not have a touch screen. In some embodiments, as shown in FIGS. **23**A-**23**C, the device **100** provides a physical select key **2302** on the physical keyboard **370** coupled to the portable multifunction device **100**.

[0400] As described below, the method **2200** provides a multifunction tab key that can be used for pane switching in an active window and/or providing auto suggestion at a portable multifunction device. This method is faster and easier to perform than conventional pane switching and auto suggestion methods and systems, e.g., conventional pane switching and auto suggestion through a conventional keyboard with multiple key entries for pane switching and auto suggestion. The method is also intuitive for users, thereby reducing the cognitive burden on the user, and creating a more efficient human-machine interface. A more efficient input mechanism also requires less computing resources, thereby increasing battery life of the device.

[0401] The device **100** detects (**2206**) an input on a dedicated tab key of the physical keyboard. In response to detecting the input, the device determines (**2208**) whether the portable multifunction device is in an editing mode to edit content. In accordance with a determination that the portable multifunction device is not in an editing mode, the device identifies (**2210**) an active window of the portable multifunction device and an active pane in the active window, and switches to a pane of the active window different from the active pane. In some embodiments, the active window comprises (**2212**) multiple panes with the active pane highlighted allowing navigation within the active pane.

[0402] For example, in FIG. **23**A, the active window for an email interface displayed on the touch screen **112** includes two panes **2304** and **2306** when the email application is not in an editing mode. The left pane **2304** includes a list of emails in the inbox with snippets of each message. When the left pane **2304** is the active pane, as shown in FIG. **23**A, the active pane is highlighted, e.g., shown by a different shading, color, and/or border, and a user can use the up or down arrow key on the physical keyboard to scroll up or down the email list. Adjacent the left pane **2304** is the right pane **2306**, which contains an expanded view of a message. When the right pane **2306** is active, as shown in FIG. **23**B, the email content pane **2306** is highlighted, and the user can view the entire message within the email content pane using the arrow keys.

[0403] In some embodiments, using the dedicated tab key to switch to a different pane from the active pane includes (**2214**) ceasing to highlight the previously active pane, and highlighting the newly active pane. For example, initially the left pane **2304** containing a list of emails is highlighted as indicated by the shade in FIG. **23**A. In response to detecting the input **2324-1** on the tab key **2302**, the device ceases to highlight the left pane **2304**, and highlights the right pane **2306** to indicate that the right pane **2306** containing the expanded view of a message is active. At this point, the user can use the up or down arrow key on the physical keyboard to scroll up or down the entire message, as shown in FIG. **23**B.

[0404] The above examples relate to the active pane switching function associated with the tab key when the portable multifunction device is not in an editing mode. Referring back to FIG. **22**, in accordance with a determination that the portable multifunction device is in an editing mode, the device displays (**2216**) a list of suggested words for selection to be inserted into the content in response to detecting an input on the multifunction tab key. In some embodiments, the list of suggested words is generated (**2218**) based on a word closest to a cursor.

[0405] For example, in FIG. **23**C, a partial entry of a word has been entered into the editable content **2300**. In response to detecting the input **2324-3** on the tab key **2302**, the device displays a list of suggested words **2310** for selection. In some embodiments, the list of suggested words is generated based on the word or partial word closest to the cursor, e.g., Dragonfly, Dragonfish, Dragonking, and Dragonlady are all related to the partial word "Drago" preceding the cursor. In some embodiments, the list of suggested words is generated based on a selection of content in the editable content **2300**. The user can then scroll through the list **2310** to select a word for insertion into the editable content **2300**. In some embodiments, the list of suggested words also includes definitions and/or pronunciations of the suggested words, or the ability to lookup the word in a dictionary or thesaurus. In some embodiments, if there is another editable pane or form within the same user interface, selecting the tab key will move the cursor to the next editable form or pane.

[0406] It should be understood that the particular order in which the operations in FIG. **22** have been described is merely exemplary and is not intended to indicate that the described order is the only order in which the operations could be performed. One of ordinary skill in the art would recognize various ways to reorder the operations described herein. For brevity, these details are not repeated here.

[0407] In accordance with some embodiments, FIG. **24** shows a functional block diagram of a portable multifunction device **2400** configured in accordance with the principles of the various described embodiments. The functional blocks of the device are, optionally, implemented by hardware, software, or a combination of hardware and software to carry out the principles of the various described embodiments. It is understood by persons of skill in the art that the functional blocks described in FIG. **24** are, optionally, combined or separated into sub-blocks to implement the principles of the various described embodiments. Therefore, the description herein optionally supports any possible combination or separation or further definition of the functional blocks described herein.

[0408] As shown in FIG. **24**, a portable multifunction device **2400** includes a touch-sensitive display unit **2402** configured to display user interfaces (editable content on the display unit) and configured to detect touch inputs (contacts), and a processing unit **2408** coupled with the touch-sensitive display unit **2402**. In some embodiments, the portable multifunction device includes one or more sensor units **2404** and the processing unit **2408** is coupled with the touch-sensitive display unit **2402** and the one or more sensor units **2404**. In some embodiments, processing unit **2408** includes one or more of the following sub-units: detecting unit **2410**, determining unit **2412**, identifying unit **2414**, switching unit **2416**, displaying unit **2418**, and highlighting unit **2420**. In some embodiments, the portable multifunction device **2400** is removably coupled to a physical keyboard

unit **2406** (e.g., the physical keyboard **370**), which further includes one or more sensor units **2407** (e.g., the sensors **374**, FIG. **3**B).

[0409] The processing unit **2408** is configured to detect (e.g., with the detecting unit **2410**) an input on a dedicated tab key of the physical keyboard unit **2406**. In response to detecting the input, the processing unit **2408** is configured to determine (e.g., with the determining unit **2412**) whether the portable multifunction device is in an editing mode to edit content. In accordance with a determination that the portable multifunction device is not in an editing mode, the processing unit **2408** is configured to identify (e.g., with the identifying unit **2414**) an active window of the portable multifunction device and an active pane in the active window; and switch (e.g., with the switching unit **2416**) to a pane of the active window different from the active pane. On the other hand, in accordance with a determination that the portable multifunction device is in an editing mode, the processing unit **2408** is configured to display (e.g., with the displaying unit **2418**) a list of suggested words for selection to be inserted into the content.

[0410] In some embodiments, the physical keyboard unit **2406** is decoupled from the portable multifunction device and connected to an electronic device.

[0411] In some embodiments, the active window comprises multiple panes with the active pane highlighted allowing navigation within the active pane.

[0412] In some embodiments, switching to the pane of the active window different from the active pane includes ceasing to highlight (e.g., with the highlighting unit **2420**) the active pane; and indicating the pane as the active pane by highlighting (e.g., with the highlighting unit **2420**) the pane.

[0413] In some embodiments, the list of suggested words is generated based on a word closest to a cursor.

[0414] The operations in the information processing methods described above are, optionally implemented by running one or more functional modules in information processing apparatus such as general purpose processors (e.g., as described above with respect to FIGS. **1**A and **3**A-**3**B) or application specific chips.

[0415] The operations described above with reference to FIGS. **23**A-**23**C are, optionally, implemented by components depicted in FIGS. **1**A-**1**B or FIG. **24**. For example, detecting operation **2410**, determining operation **2412**, identifying operation **2414**, switching operation **2416**, displaying operation **2418**, and highlighting operation **2420** are, optionally, implemented by event sorter **170**, event recognizer **180**, and event handler **190**. Event monitor **171** in event sorter **170** detects a contact on touch-sensitive display **112**, and event dispatcher module **174** delivers the event information to application **136-1**. A respective event recognizer **180** of application **136-1** compares the event information to respective event definitions **186**, and determines whether a first contact at a first location on the touch-sensitive surface corresponds to a predefined event or sub-event, such as selection of an object on a user interface. When a respective predefined event or sub-event is detected, event recognizer **180** activates an event handler **190** associated with the detection of the event or sub-event. Event handler **190** optionally utilizes or calls data updater **176** or object updater **177** to update the application internal state **192**. In some embodiments, event handler **190** accesses a respective GUI updater **178** to update what is displayed by the application. Similarly, it would be clear to a person having ordinary skill in the art how other processes can be implemented based on the components depicted in FIGS. **1**A-**1**B.

[0416] Dedicated Share Key

[0417] FIG. **25** is a flow chart illustrating a method **2500** of content sharing and insertion using a dedicated share key, in accordance with some embodiments. FIGS. **26**A-**26**B, which illustrate exemplary user interfaces of using a multifunction share key, are used to illustrate the processes in FIG. **25**. The method **2500** is performed (**2502**) at a portable multifunction device (e.g., the device **100** in FIG. **1**A) with a touch-sensitive display (e.g., the touch screen display **112** in FIG. **1**A) and a physical keyboard (e.g., the physical keyboard **370** in FIG. **3**B) removably coupled to the portable multifunction device. As explained above in connection with FIG. **3**B, in some embodiments, the keyboard **370** is communicatively coupled to the portable multifunction device **100** by contact (e.g., Smart Connect from Apple Computer, Inc. of Cupertino, Calif.), via a wired connection (e.g., USB, PS/2), or via a wireless communication link (e.g., optical, Bluetooth, Wi-Fi, or the like). In some embodiments, the physical keyboard is (**2504**) decoupled from the portable multifunction device and connected to an electronic device. For example, the physical keyboard **370** as shown in FIG. **3**B and FIGS. **26**A-**26**B can be connected to a different electronic device that does not have a touch screen. In some embodiments, as shown in FIGS. **26**A-**26**B, the device **100** provides a physical share key **2602** on the physical keyboard **370** coupled to the portable multifunction device **100**.

[0418] As described below, the method **2500** provides an efficient mechanism for sharing content among applications at a portable multifunction device or across devices. This method is faster and easier to perform than conventional content sharing methods and systems, e.g., conventional content sharing through a conventional keyboard with multiple keys for content sharing and multiple key entries for content sharing. The method is also intuitive for users, thereby reducing the cognitive burden on the user, and creating a more efficient human-machine interface. A more efficient input mechanism also requires less computing resources, thereby increasing battery life of the device.

[0419] The device displays (**2506**) content on the display and detects (**2508**) an input on a dedicated share key of the physical keyboard. In response to detecting the input or selection of the dedicated share key, the device determines (**2510**) whether the content is editable. In accordance with a determination that the content is editable, the device displays (**2512**) an insert menu through which a user can insert content into the content. In some embodiments, the insert menu includes (**2514**) options corresponding to inserting photos, videos, music, calendar, web page, map and/or contacts into the content.

[0420] For example, in FIG. **26**A, an email composer interface is displayed and the email content **2600** is editable. In response to detecting an input **2624-1** on the dedicated share key **2602** and in accordance with a determination that the email content **2600** is editable, the device displays an insert menu **2610** next to the insertion marker **2622**. The insert menu **2610** includes icons for inserting photos, videos, music, calendar, web page (or link to a web page), map and/or contacts (not shown).

[0421] Through the share menu, content from other applications on the device can be shared with the email application and quickly inserted into the editable content. This method is faster and easier to perform than conventional

content sharing methods and systems, e.g., conventional insertion methods of first switching to a different application using one or more key entries, then selecting the content to be inserted using more key entries, and finally switching back to the editor for insertion of the selected content using yet more key entries. The method is also intuitive for users, thereby reducing the cognitive burden on the user, and creating a more efficient human-machine interface. A more efficient input mechanism also requires less computing resources, thereby increasing battery life of the device.

[0422] Referring back to FIG. **25**, in some embodiments, in accordance with a determination that the content is not editable, the device displays (**2516**) a share menu through which a user can share the content or a portion of the content. In some embodiments, the portion of the content is selected (**2518**) prior to detecting the input on the dedicated share key. In some embodiments, the share menu includes (**2520**) options corresponding to sharing the portion of the content with a user or application through screen sharing, an instant message, email, social media, and/or making a copy.

[0423] For example, in FIG. **26**B, a browser interface is displayed on the touch screen **112**. The web content displayed in the browser interface is not editable. In response to detecting an input **2624-2** on the dedicated share key **2602** and in accordance with a determination that the web content is not editable, the device displays a share menu **2612**. In FIG. **26**B, the content "iPad Pro" was selected prior to receiving the input **2624-2** and the selected content "iPad Pro" is marked by the selection indicators. The share menu **2612** is displayed adjacent the selection indicators. The share menu **2612** includes options for sharing the selected content "iPad Pro" with a user, a device, or an application through screen sharing (e.g., via a short-range communication protocol such as AIRDROP), instant message, email, social media (e.g., TWITTER, FACEBOOK, and/or INSTAGRAM, etc.), and/or by making a copy of the selected content.

[0424] Having a multifunction share key for sharing non-editable content with other applications and for sharing content from other application with editable content is faster and easier to perform than conventional content sharing methods and systems. The method is also intuitive for users, as both sharing to and sharing from functions are implemented with one dedicated share key, thereby reducing the cognitive burden on the user, and creating a more efficient human-machine interface. A more efficient input mechanism also requires less computing resources, thereby increasing battery life of the device.

[0425] It should be understood that the particular order in which the operations in FIG. **25** have been described is merely exemplary and is not intended to indicate that the described order is the only order in which the operations could be performed. One of ordinary skill in the art would recognize various ways to reorder the operations described herein. For brevity, these details are not repeated here.

[0426] In accordance with some embodiments, FIG. **27** shows a functional block diagram of a portable multifunction device **2700** configured in accordance with the principles of the various described embodiments. The functional blocks of the device are, optionally, implemented by hardware, software, or a combination of hardware and software to carry out the principles of the various described embodiments. It is understood by persons of skill in the art that the functional blocks described in FIG. **27** are, optionally, combined or separated into sub-blocks to implement the principles of the various described embodiments. Therefore, the description herein optionally supports any possible combination or separation or further definition of the functional blocks described herein.

[0427] As shown in FIG. **27**, a portable multifunction device **2700** includes a touch-sensitive display unit **2702** configured to display user interfaces (editable content on the display unit) and configured to detect touch inputs (contacts), and a processing unit **2708** coupled with the touch-sensitive display unit **2702**. In some embodiments, the portable multifunction device includes one or more sensor units **2704** and the processing unit **2708** is coupled with the touch-sensitive display unit **2702** and the one or more sensor units **2704**. In some embodiments, processing unit **2708** includes one or more of the following sub-units: displaying unit **2710**, detecting unit **2712**, determining unit **2714**, selecting unit **2716**. In some embodiments, the portable multifunction device **2700** is removably coupled to a physical keyboard unit **2706** (e.g., the physical keyboard **370**), which further includes one or more sensor units **2707** (e.g., the sensors **374**, FIG. **3**B).

[0428] The processing unit **2708** is configured to display (e.g., with the displaying unit **2710**) content on the display unit **2702**. The processing unit **2708** is further configured to detect (e.g., with the detecting unit **2712**) an input on a dedicated share key of the physical keyboard unit **2706**. In response to detecting the input, the processing unit **2708** is configured to determine (e.g., with the determining unit **2714**) whether the content is editable. In accordance with a determination that the content is editable, the processing unit **2708** is configured to display (e.g., with the displaying unit **2710**) an insert menu through which a user can insert content into the content; and in accordance with a determination that the content is not editable, the processing unit **2708** is configured to display (e.g., with the displaying unit **2710**) a share menu through which a user can share a portion of the content.

[0429] In some embodiments, the physical keyboard unit **2706** is decoupled from the portable multifunction device and connected to an electronic device.

[0430] In some embodiments, the insert menu includes options corresponding to inserting photos, videos, music, calendar, web page, map, and/or contacts into the content.

[0431] In some embodiments, the portion of the content is selected prior to detecting the input on the dedicated share key.

[0432] In some embodiments, the share menu includes options corresponding to sharing the portion of the content with a user, device, and/or application through screen sharing, instant message, email, social media, and/or copy.

[0433] The operations in the information processing methods described above are, optionally implemented by running one or more functional modules in information processing apparatus such as general purpose processors (e.g., as described above with respect to FIGS. **1**A and **3**A-**3**B) or application specific chips.

[0434] The operations described above with reference to FIGS. **26**A-**26**B are, optionally, implemented by components depicted in FIGS. **1**A-**1**B or FIG. **27**. For example, displaying operation **2710**, detecting operation **2712**, determining operation **2714**, and selecting operation **2716** are, optionally, implemented by event sorter **170**, event recognizer **180**, and event handler **190**. Event monitor **171** in

event sorter **170** detects a contact on touch-sensitive display **112**, and event dispatcher module **174** delivers the event information to application **136-1**. A respective event recognizer **180** of application **136-1** compares the event information to respective event definitions **186**, and determines whether a first contact at a first location on the touch-sensitive surface corresponds to a predefined event or sub-event, such as selection of an object on a user interface. When a respective predefined event or sub-event is detected, event recognizer **180** activates an event handler **190** associated with the detection of the event or sub-event. Event handler **190** optionally utilizes or calls data updater **176** or object updater **177** to update the application internal state **192**. In some embodiments, event handler **190** accesses a respective GUI updater **178** to update what is displayed by the application. Similarly, it would be clear to a person having ordinary skill in the art how other processes can be implemented based on the components depicted in FIGS. **1**A-**1**B.

[0435] Dedicated Notification Key

[0436] FIG. **28** is a flow chart illustrating a method **2800** of providing notification using a dedicated notification key, in accordance with some embodiments. FIGS. **29**A-**29**F, which illustrate exemplary user interfaces of using a notification key, are used to illustrate the processes in FIG. **28**. The method **2800** is performed (**2802**) at a portable multifunction device (e.g., the device **100** in FIG. **1**A) with a touch-sensitive display (e.g., the touch screen display **112** in FIG. **1**A) and a physical keyboard (e.g., the physical keyboard **370** in FIG. **3**B) removably coupled to the portable multifunction device. The physical keyboard contains at least one sensor (e.g., the sensors **374**, FIG. **3**B) for detecting contact intensities of inputs on keys of the physical keyboard. As explained above in connection with FIG. **3**B, in some embodiments, the keyboard **370** is communicatively coupled to the portable multifunction device **100** by contact (e.g., Smart Connect from Apple Computer, Inc. of Cupertino, Calif.), via a wired connection (e.g., USB, PS/2), or via a wireless communication link (e.g., optical, Bluetooth, Wi-Fi, or the like). In some embodiments, the physical keyboard is (**2804**) decoupled from the portable multifunction device and connected to an electronic device. For example, the physical keyboard **370** as shown in FIG. **3**B and FIGS. **29**A-**29**F can be connected to a different electronic device that does not have a touch screen. In some embodiments, as shown in FIGS. **29**A-**29**F, the device **100** provides a physical notification key **2602** on the physical keyboard **370** coupled to the portable multifunction device **100**.

[0437] As described below, the method **2800** provides an efficient mechanism for displaying notifications at a portable multifunction device. This method is faster and easier to perform than conventional notification displaying methods and systems, e.g., using a conventional keyboard with multiple key entries for displaying notifications. The method is also intuitive for users, thereby reducing the cognitive burden on the user, and creating a more efficient human-machine interface. A more efficient input mechanism also requires less computing resources, thereby increasing battery life of the device.

[0438] The device detects (**2806**) an input on a dedicated notification key of the physical keyboard. The device then determines (**2808**) if the input is of a first type or a different second type. In some embodiments, the first type of the input is a tap on the dedicated notification key of the physical keyboard, and the second type of the input is a press-and-hold (or deep press or double tap) on the dedicated notification key of the physical keyboard.

[0439] Upon determining that the input is of the first type (**2812**): the device determines (**2814**) whether a new notification is available. In some embodiments, the new notification includes (**2816**) one or more new communications, one or more status changes, and/or one or more new posts. For example, in FIG. **29**A, the notification **2910** displayed on top of the touch screen **112** as a banner that contains a notification for a new incoming email communication. Further upon determining that the input is of the first type and a notification is available, the device activates (**2818**) an application associated with the notification; and upon determining that the input is of the first type and no new notification is available, the device displays (**2820**) a notification center. An example of a notification center **2912** is shown in FIG. **29**D. As shown, in some embodiments, the notification center **2912** displays appointment and widget status updates in addition to email communications. In some embodiments, upon determining that no new notifications are available, a notification center slides (**2822**) onto the display from one edge of the display until the entire notification center is displayed. In some embodiments, the device further receives (**2824**) a second input on the dedicated notification key to dismiss the display of the notification center and return to the prior screen.

[0440] For example, in FIG. **29**A, while a browser application interface is displayed on the touch screen **112**, a new notification **2910** appears on the screen **112** as a banner to notify the user of a new email. While the new notification **2910** is displayed on the screen **112**, the device detects an input **2924-1**, e.g., a tap on the notification key **2902**. The device determines that the tap **2924-1** is of the first type, and that a new notification **2910** is available. The device then activates the email application associated with the notification **2910** and displays the email application user interface, as shown in FIG. **29**B. In FIG. **29**B, the new email is opened and the content of the new email is displayed to the user in the email application user interface. In comparison, in FIG. **29**C, when no new notification is available and the device detects the input **2924-2**, e.g., a tap on the notification key **2902** that is of the first type, the notification center **2912** is displayed, as shown in FIG. **29**D. In some embodiments, as indicated by the dotted line, the notification center **2912** is displayed by gradually sliding down from the top edge of the touch screen **112** and overlaying on top of the active window(s), e.g., the browser application interface, until the entire notification center **2912** is displayed on the touch screen display **112**, as shown in FIG. **29**E. In FIG. **29**E, while the notification center **2912** is displayed on the touch screen **112**, in response to receiving a second input, e.g., a tap **2924-3** on the notification key **2902**, the device ceases to display the notification center **2912** and reveals the previously displayed active window.

[0441] Having a dedicated notification key and displaying content of the notification in response to a tap on the notification key provides an efficient mechanism for displaying notifications at a portable multifunction device. Conventional keyboards do not have a dedicated notification key, and instead, the user must rely on shortcut keys or other input methods to view notifications. Thus the method described herein is faster and easier to perform than con-

ventional notification display methods and systems. The method is also intuitive for users, thereby reducing the cognitive burden on the user, and creating a more efficient human-machine interface. A more efficient input mechanism also requires less computing resources, thereby increasing battery life of the device.

[0442] Referring back to FIG. **28**, upon determining that the input is of the second type: the device temporarily displays (**2826**) the notification center on the display and then ceases to display the notification center upon a release of the notification key. For example, FIG. **29**F illustrates a quick view of the notification center **2912** by pressing and holding the notification key **2902** (and/or by maintaining a deep press on the notification key **2902**). In some embodiments, upon determining that the input **2924-3** is of the second type, e.g., a press-and-hold (and/or deep press) on the notification key **2902**, while the key **2902** is still pressed, the notification center **2912** is slid down from the top edge of the touch screen display **112**. Though not shown in FIG. **29**F, in response to a release of the notification key **2902**, the device ceases to display the notification center **2912** by sliding the notification screen up to the top edge of the touch screen display **112**.

[0443] Providing a preview of the notification center in response to a press-and-hold and/or deep press on the dedicated notification key is an efficient mechanism for displaying notifications at a portable multifunction device. Conventional keyboards do not have a dedicated notification key or a mechanism for previewing notifications. Thus the method described herein is faster and easier to perform than conventional notification display methods and systems. The method is also intuitive for users, e.g., while holding on to the notification key, the notification center is displayed and, upon release of the notification key, the notification ceases to display, thereby reducing the cognitive burden on the user, and creating a more efficient human-machine interface. A more efficient input mechanism also requires less computing resources, thereby increasing battery life of the device.

[0444] It should be understood that the particular order in which the operations in FIG. **28** have been described is merely exemplary and is not intended to indicate that the described order is the only order in which the operations could be performed. One of ordinary skill in the art would recognize various ways to reorder the operations described herein. For brevity, these details are not repeated here.

[0445] In accordance with some embodiments, FIG. **30** shows a functional block diagram of a portable multifunction device **3000** configured in accordance with the principles of the various described embodiments. The functional blocks of the device are, optionally, implemented by hardware, software, or a combination of hardware and software to carry out the principles of the various described embodiments. It is understood by persons of skill in the art that the functional blocks described in FIG. **30** are, optionally, combined or separated into sub-blocks to implement the principles of the various described embodiments. Therefore, the description herein optionally supports any possible combination or separation or further definition of the functional blocks described herein.

[0446] As shown in FIG. **30**, a portable multifunction device **3000** includes a touch-sensitive display unit **3002** configured to display user interfaces (editable content on the display unit) and configured to detect touch inputs (contacts), and a processing unit **3008** coupled with the touch-sensitive display unit **3002**. In some embodiments, the portable multifunction device includes one or more sensor units **3004** and the processing unit **3008** is coupled with the touch-sensitive display unit **3002** and the one or more sensor units **3004**. In some embodiments, processing unit **3008** includes one or more of the following sub-units: detecting unit **3010**, determining unit **3012**, activating unit **3014**, displaying unit **3016**, sliding unit **3018**, receiving unit **3020**. In some embodiments, the portable multifunction device **3000** is removably coupled to a physical keyboard unit **3006** (e.g., the physical keyboard **370**), which further includes one or more sensor units **3007** (e.g., the sensors **374**, FIG. **3**B).

[0447] The processing unit **3008** is configured to detect (e.g., with the detecting unit **3010**) an input on a dedicated notification key of the physical keyboard unit **3006**. The processing unit **3008** is further configured to determine (e.g., with the determining unit **3012**) if the input is of a first type or a different second type. Upon determining that the input is of the first type, the processing unit **3008** is configured to determine (e.g., with the determining unit **3012**) whether a notification is available. Upon determining that the notification is available, the processing unit **3008** is configured to activate (e.g., with the activating unit **3014**) an application associated with the notification, and upon determining that no notification is available, processing unit **3008** is configured to display (e.g., with the displaying unit **3016**) a notification center. On the other hand, upon determining that the input is of the second type, the processing unit **3008** is configured to display (e.g., with the displaying unit **3016**) the notification center on the display unit **3002**; and cease to display (e.g., with the displaying unit **3016**) the notification center upon a release of the notification key.

[0448] In some embodiments, the physical keyboard unit **3006** is decoupled from the portable multifunction device and connected to an electronic device.

[0449] In some embodiments, the first type of the input is a tap on the dedicated notification key of the physical keyboard unit **3006**, and the second type of the input is a press-and-hold or deep press on the dedicated notification key of the physical keyboard unit **3006**.

[0450] In some embodiments, the notification includes one or more received communications, one or more status changes, and/or one or more new posts.

[0451] In some embodiments, upon determining that no notification is available, displaying a notification center includes sliding (e.g., with the sliding unit **3018**) the notification center from one edge of the display unit **3002** into the display unit **3002** until the entire notification center is on the display unit **3002**.

[0452] The processing unit **3008** is further configured to receive (e.g., with the receiving unit **3020**) a second input on the dedicated notification key to dismiss the display of the notification center.

[0453] The operations in the information processing methods described above are, optionally implemented by running one or more functional modules in information processing apparatus such as general purpose processors (e.g., as described above with respect to FIGS. **1**A and **3**A-**3**B) or application specific chips.

[0454] The operations described above with reference to FIGS. **29**A-**29**F are, optionally, implemented by components depicted in FIGS. **1**A-**1**B or FIG. **30**. For example, detecting operation **3010**, determining operation **3012**, activating operation **3014**, displaying operation **3016**, sliding operation

3018, receiving operation 3020 are, optionally, implemented by event sorter 170, event recognizer 180, and event handler 190. Event monitor 171 in event sorter 170 detects a contact on touch-sensitive display 112, and event dispatcher module 174 delivers the event information to application 136-1. A respective event recognizer 180 of application 136-1 compares the event information to respective event definitions 186, and determines whether a first contact at a first location on the touch-sensitive surface corresponds to a predefined event or sub-event, such as selection of an object on a user interface. When a respective predefined event or sub-event is detected, event recognizer 180 activates an event handler 190 associated with the detection of the event or sub-event. Event handler 190 optionally utilizes or calls data updater 176 or object updater 177 to update the application internal state 192. In some embodiments, event handler 190 accesses a respective GUI updater 178 to update what is displayed by the application. Similarly, it would be clear to a person having ordinary skill in the art how other processes can be implemented based on the components depicted in FIGS. 1A-1B.

[0455] Touch-Strip

[0456] FIG. 31A illustrates a detachable keyboard (e.g., the keyboard 370 in FIG. 3B) with one or more touch-sensitive input strips, in accordance with some embodiments. FIG. 31B illustrates a system comprising a keyboard 370 and a touch screen device (e.g., the portable multifunction device 100, FIGS. 1A-1B), in accordance with some embodiments. FIGS. 32A-32L, which illustrate exemplary user interfaces on the portable multifunction device 100, are used to illustrate the usage of the detachable keyboard 370 with one or more touch-sensitive input strips.

[0457] In FIGS. 31A and 31B, the detachable keyboard 370 with one or more touch-sensitive input strips comprises a housing 3102. As shown, the housing 3102 has a top side, bottom side, left side, and right side. A plurality of physical keys are arranged in a key area 3104 that is at least partially contained within the housing 3102. In some embodiments, these keys include multifunctional keys described above. For example, the multifunctional keys arranged in the key area 3104 include an emoji key (e.g., the emoji key 802, FIGS. 8A-8F) for entering emoji and punctuation characters, a currency key (e.g., the currency key 1002, FIGS. 11A-11E) for entering currency character and automated currency conversion, an address key (e.g., the address key, FIGS. 14A-14E) for address suggestions and entries, a home key (e.g., the home key 1702, FIGS. 17A-17E) for displaying home screen and toggling active windows, a select key (e.g., the select key 2002, FIGS. 20A-20C) for content selection, a tab key (e.g., the tab key 2302, FIGS. 23A-23C) for active pane switching and word auto suggestions, a share key (e.g., the share key 2602, FIGS. 26A-26B) for content sharing, and a notification key (e.g., the notification key 2902, FIGS. 29A-29F) for displaying notifications. By removing less frequently used keys and including these multifunction keys, the size of the physical keyboard is reduced while reducing the need for the user to reach up from the keyboard.

[0458] In addition to the physical keys, in FIGS. 31A and 31B, at least one connector 3106 is disposed at the top side of the housing 3102 to connect the detachable keyboard 370 to a touch screen device, e.g., the portable multifunction device 100 (FIGS. 1A-1B), which has at least one corresponding connector 368. As explained above in connection with FIGS. 1A-1B and FIG. 3B, in some embodiments as shown in FIG. 31B, through the one or more connectors 3106 and the connector 368, the keyboard 370 is communicatively coupled to the portable multifunction device 100 by contact (e.g., Smart Connect from Apple Computer, Inc. of Cupertino, Calif.), via a wired connection (e.g., USB, PS/2), or via a wireless communication link (e.g., optical, Bluetooth, Wi-Fi, or the like). Thus, in some embodiments, the one or more connectors 3106 are electrical contacts; and in some embodiments, the one or more connectors 3106 are optical connectors. Using these connectors, in some embodiments, the physical keyboard 370 can be decoupled from the portable multifunction device and connected to one or more electronic devices. For example, the physical keyboard 370 as shown in FIG. 3B and FIGS. 31A-31B can be connected to a different electronic device that does not have a touch screen.

[0459] The keyboard 370 further comprises at least one elongate touch-sensitive strip 3108-1 disposed at the left side of the housing 3102, and at least one elongate touch-sensitive strip 3108-2 disposed at the right side of the housing 3102. Though not shown in FIGS. 31A and 31B, other elongate touch-sensitive strips can be disposed at the top and/or bottom sides of the housing 3102. Each touch-sensitive strip 3108 contains one or more sensors to detect one or more contacts with, sliding movements, and/or a breaking of contact with the sensor(s). Such sensors use capacitive, resistive, infrared, force, and/or surface acoustic wave technologies. Using these touch strips, the keyboard 370 provides hardware optimized for scrolling without needing a full trackpad on the keyboard and reduces the need for the user to reach up from the keyboard to the touch screen display of the portable multifunction device.

[0460] In some embodiments, a length of the touch-sensitive strip extends across a majority of each respective side of the housing. As shown in FIGS. 31A and 31B, the left elongate touch-sensitive strip 3108-1 is long enough to extend across a majority of the left side of the housing 3102 and the right elongate touch-sensitive strip 3108-2 is long enough to extend across a majority of the right side of the housing 3102. In some embodiments, the touch-sensitive strips include one or more markings 3110 (e.g., marking 3110-1 and marking 3110-2) to indicate different regions of the touch-sensitive strip. A touch input starting within a particular region of the touch-sensitive strip followed by movement of the contact on the touch-sensitive strip may cause the device 100 to perform a particular action, as described in greater detail below with reference to FIGS. 32E-32G.

[0461] In some embodiments, the keyboard 370 further comprises sensors, e.g. contact intensity sensors 3111, configured to acquire contact intensity information (e.g., pressure information or a proxy for pressure information) from user inputs. For example, in FIG. 31B, the contact intensity sensors 3111 are disposed below the arrow keys for detecting the pressure on the arrow keys. Though not shown in FIGS. 31A and 31B, in some embodiments, contact intensity sensors are disposed under or proximate the touch-sensitive strips 3108 of the physical keyboard 370, so that both contact and contact intensity on the touch-sensitive strips 3108 can be detected. Also not shown in FIGS. 31A and 31B, in some embodiments the keyboard 370 further comprises microphones or vibration sensors for detecting gestures, e.g., swipes on a surface. For example, the microphones or vibration sensors can be installed under the

keyboard **370** such that when the keyboard **370** is placed on a surface, e.g., a desk surface, swipes on the desk surface can be detected by the microphone or vibration sensors thereby turning the desk surface to a touch-sensitive surface. Using these sensors, the keyboard **370** provides hardware optimized for scrolling without the need for a full trackpad reduces the need to reach up to the touch screen of the portable multifunction device.

[0462] In some embodiments, the contact intensity sensors can be used to sense a force on the arrow keys, and depending on the force, the velocity of scrolling can be adjusted. Similarly, the velocity of scrolling can be adjusted based on a speed of a swipe on the touch-sensitive strips.

[0463] FIGS. **32**A-**32**L illustrate exemplary user interfaces on the portable multifunction device **100** that are used to illustrate the usage of the detachable keyboard **370** with the one or more touch-sensitive input strips. In some embodiments, the touch screen device (e.g., the portable multifunction device **100**, FIGS. **1**A-**1**B) comprises a processor and memory containing instructions for: detecting, via the at least one elongate touch-sensitive strip, a swipe along at least a portion of the length of the at least one elongate touch-sensitive strip; and in response to detecting the swipe, scrolling content displayed on the touch screen device in a direction associated with the swipe.

[0464] For example, in FIG. **32**A, the portable multifunction device **100**, via the right elongate touch-sensitive strip **3108-2** detects a swipe **3124-1** along the length of the right elongate touch-sensitive strip **3108-2** and toward the top side of the physical keyboard **370**'s housing. As shown in FIG. **32**B, in response to detecting the swipe **3124-1**, the device **100** scrolls the email content toward the top side of the display. In FIG. **32**B, the "from" and "to" address lines in the email are scrolled off the display and more content from the second paragraph of the email content is scrolled onto the display **112**.

[0465] In some embodiments, the speed of the scrolling is proportional to the speed of the swipe. For example, in FIG. **32**C, a faster swipe **3124-2** (or a flick) is detected along the length of the right elongate touch-sensitive strip **3108-2** toward the top of the keyboard **370**'s housing. In response to detecting the faster swipe **3124-2**, the device **100** scrolls the email content up and to the top of the touch screen display **112** at a proportionate and higher speed, as shown in FIG. **32**D. As shown in FIGS. **32**C and **32**D, the email headers are scrolled up and off of the touch screen display **112**, while the email content is scrolled up and almost reaches the end of the email. In comparison, in FIGS. **32**A and **32**B, in response to a slower swipe, a portion of the email headers remains on the touch screen display **112** and the second complete paragraph of the email content starts to move to the center of the display **112**.

[0466] Thus, swiping on the touch-sensitive strips towards/away from the screen scrolls the content on the display up/down. Further, the content scrolling is performed in accordance with the contact movement on the touch-sensitive strips, e.g., a swipe on the touch-sensitive strips causes slow scrolling and a flick on the strips causes faster scrolling with an inertia effect, e.g., the scrolling slows down near the end of the movement. Using these touch strips, the keyboard **370** provides hardware optimized for scrolling without the need for a full trackpad and prevents unnecessary reaching up from the keyboard to the touch screen display of the portable multifunction device.

[0467] Turning to FIG. **32**E, the device **100**, via the right touch-sensitive strip **3108-2**, detects a contact **3124-3** within a top region of the touch-sensitive strip **3108-2**. The marking **3110-2** divides the touch-sensitive strip **3108-2** into a top region and a bottom region, where the top region is closer to the top side of the keyboard **370** housing. Though FIG. **32**E shows one marking dividing the touch-sensitive strip **3108-2** into two regions, more than one marking can be used to divide the touch-sensitive strip **3108-2** into more than two regions.

[0468] In response to detecting the contact **3124-3** within the top region of the touch-sensitive strip and the subsequent movement of the contact **3124-3** in a direction away from the top side of the housing and/or the at least one connector, the device **100** gradually slides the notification center interface onto the touch screen **112** as an overlay from the one edge of the touch screen **112**, as shown in FIG. **32**F. This occurs until the entire notification center interface is displayed on the touch screen **112**, as shown in FIG. **32**G. In some embodiments, while the finger movement remains in contact with the touch-sensitive strip **3108-2**, the sliding of the notification center is performed in accordance with the movement of the contact **3124-3**, e.g., when the finger sliding on the touch-sensitive strip **3108-2** is slower, the sliding of the notification center is slower. In some embodiments, after a lift-off of the contact **3124-3** is detected and in accordance with a determination that the notification center has not been entirely displayed on the touch screen **112**, the notification center continues to slide into the display to mimic an inertia effect of the swipe on the touch-sensitive strip **3108-2**.

[0469] In some implementations, in response to detecting a downward swipe starting from a top portion of the touch strip, the notification center is pulled down. Similarly, a upward swipe pulls-up/closes the notification center.

[0470] In some embodiments, the memory of the touch screen device **100** further contains instructions for: detecting via the at least one elongate touch-sensitive strip, while the notification center is displayed on the display of the touch screen device, a second contact on the at least one elongate touch-sensitive strip, followed by a movement of the second contact in a direction to the top side of the detachable keyboard and toward the at least one connector; and in response to detecting the second contact followed by the movement of the second contact, ceasing to display the notification on the display of the touch screen device.

[0471] For example, in FIG. **32**H, when the entire notification center is displayed on the touch screen **112**, and the device **100**, via the touch-sensitive strip **3108**, detects a subsequent movement of the contact **3124-4** toward the top side of the housing, the device ceases to display the notification center by sliding the notification center interface off the touch screen **112** and reveals the user interface displayed underneath, as shown in FIG. **32**I. Similarly, in some embodiments, the notification center is slid up on the touch screen **112** in accordance with the upward movement of the contact **3124-4**. Again, this allows a user of the portable multifunction device to keep their hands on the keyboard without the need to reach up to the touch screen display.

[0472] In some embodiments, the touch screen device comprises a processor and memory containing instructions for: displaying a first pane in an active window on a display of the touch screen device; detecting, via the at least one elongate touch-sensitive strip, a contact followed by a move-

ment of the contact in a direction parallel to the top side of the detachable keyboard; and in response to detecting the contact followed by the movement of the first, sliding a second pane into the display of the touch screen device in accordance with the direction and movement of the first contact until the second pane replaces the first pane in the application interface on the display, wherein the first pane and the second pane are in a navigational hierarchy specified for the active window.

[0473] For example, FIG. **32**J shows an email application interface displayed on the touch screen **112** as the active window. The left side of the email application interface includes an inbox pane. The inbox pane can be navigated to by, for example, selecting the inbox from the mailboxes pane. The mailboxes pane can be navigated to, for example, by selecting the back button labeled as "Mailboxes." Thus, the inbox and mailboxes panes are in a navigational hierarchy of the email application interface. In FIG. **32**K, the device detects a contact **3124-5** on the touch-sensitive strip **3108-2** followed by a movement of the contact **3124-5** in a direction to the right and parallel to the top side of the keyboard **370**. In response to detecting the contact **3124-5** followed by the rightward movement, the device slides the mailboxes pane into the display **112** of the device **100** in a rightward direction, as shown in FIG. **32**K, until the mailboxes pane replaces the inbox pane in the email application interface on the display **112**, as shown in FIG. **32**L.

[0474] Thus, swiping side-to-side on the touch-sensitive strip reveals different navigational levels of the user interface hierarchy. Again, using the touch strips of the keyboard **370** reduces the need to reach up from the keyboard to the touch screen display of the portable multifunction device.

[0475] Though FIGS. **32**J-**32**L illustrate the contact **3124-5** on the right touch-sensitive strip **3108-2**, similar contacts **3124-5** can be detected on left, top, and/or bottom touch-sensitive strips of the keyboard **370**. Further, although FIGS. **32**A-**32**L illustrate a single contact **3124** on one of the touch-sensitive strips, in some embodiments, multiple contacts can be simultaneously detected on one or more of the touch-sensitive strips to implement multi-finger gestures, e.g., depinch to zoom etc.

[0476] It should be understood that the particular order in which the operations in FIGS. **31**A-**31**B have been described is merely exemplary and is not intended to indicate that the described order is the only order in which the operations could be performed. One of ordinary skill in the art would recognize various ways to reorder the operations described herein. For brevity, these details are not repeated here.

[0477] In accordance with some embodiments, FIG. **33** shows a functional block diagram of an electronic device **3300** configured in accordance with the principles of the various described embodiments. The functional blocks of the device are, optionally, implemented by hardware, software, or a combination of hardware and software to carry out the principles of the various described embodiments. It is understood by persons of skill in the art that the functional blocks described in FIG. **33** are, optionally, combined or separated into sub-blocks to implement the principles of the various described embodiments. Therefore, the description herein optionally supports any possible combination or separation or further definition of the functional blocks described herein.

[0478] As shown in FIG. **33**, a detachable keyboard **3306** with one or more touch-sensitive strips includes a housing unit **3318**. As shown in FIG. **31**A and **31**B, the housing unit **3318** has top, bottom left, and right sides. The detachable keyboard **3306** further includes a plurality of physical keys arranged in a key area unit **3320** that is at least partially within the housing unit **3318**. The detachable keyboard **3306** further includes at least one connector unit **3324** disposed at the top side of the housing unit **3324** to connect the detachable keyboard **3306** to a touch screen device **3300**, and at least one elongate touch-sensitive strip unit **3322** disposed at the bottom, left, or right side of the housing, where a length of the touch-sensitive strip unit **3322** extends across a majority of its respective side of the housing unit **3318**. The detachable keyboard **3306** further includes one or more sensor units (e.g., the sensors **374**, FIG. **3**B) configured to detect touch inputs and/or contact intensities on the keys in the key area unit **3320** and/or the touch-sensitive strip unit **3322**.

[0479] In some embodiments, the detachable keyboard **3306** further includes contact intensity sensor units **3307** for detecting contact intensities on the plurality of physical keys.

[0480] In some embodiments, the detachable keyboard **3306** further includes microphones for detecting swipes on a surface.

[0481] In some embodiments, the at least one connector unit **3324** is an electrical contact.

[0482] In some embodiments, the at least one connector unit **3324** is an optical connector.

[0483] In some embodiments, the touch screen device **3300** (e.g., the portable multifunction device **100**) includes a display unit **3302** configured to display user interfaces (editable content on the display unit) and configured to detect touch inputs (contacts), and a processing unit **3308** coupled with the display unit **3302**. In some embodiments, the touch screen device **3300** includes one or more sensor units **3304** and the processing unit **3308** is coupled with the display unit **3302** and the one or more sensor units **3304**. In some embodiments, processing unit **3308** further includes one or more of the following sub-units: detecting unit **3310**, scrolling unit **3312**, sliding unit **3314**, and displaying unit **3316**.

[0484] In some embodiments, the memory of the touch screen device **3300** includes instructions for detecting (e.g., with the detecting unit **3310**), via the at least one elongate touch sensitive strip unit **3322**, a swipe along the length of the at least one elongate touch sensitive strip unit **3322**; and in response to detecting the swipe, scrolling (e.g., with the scrolling unit **3312**) content displayed on the touch screen device **3300** in a direction associated with the swipe. In such embodiments, a velocity of the scrolling is proportional to a speed of the swipe detected along the length of the at least one elongate touch sensitive strip unit **3322**.

[0485] In some embodiments, the touch screen device **3300** comprises a processor (e.g., the processing unit **3308**) and memory containing instructions for: detecting (e.g., with the detecting unit **3310**), via the at least one elongate touch sensitive strip unit **3322**, a first contact in a predefined region of the at least one elongate touch sensitive strip unit **3322**, followed by a movement of the first contact in a direction perpendicular to the top side of the detachable keyboard **3306** and away from the at least one connector unit **3324**; and in response to detecting the first contact followed by the movement of the first contact, sliding (e.g., with the sliding unit **3314**) a notification center as an overlay into a display

unit (e.g., the display unit **3302**) of the touch screen device **3300** in accordance with the movement of the first contact until the entire notification center is on the display unit **3302**. In such embodiments, the memory further includes instructions for detecting (e.g., with the detecting unit **3310**) a lift-off of the first contact; and after detecting the lift-off of the first contact and in accordance with a determination that the notification center is not entirely on the display unit of the touch screen device, continuing to slide (e.g., with the sliding unit **3314**) the notification center. Also in such embodiments, the memory further includes instructions for, while the notification center is displayed on the display **3302** of the touch screen device **3300**, detecting (e.g., with the detecting unit **3310**), via the at least one elongate touch sensitive strip unit **3322**, a second contact on the at least one elongate touch sensitive strip unit **3322**, followed by a movement of the second contact in a direction to the top side of the detachable keyboard and toward the at least one connector unit **3324**; and in response to detecting the second contact followed by the movement of the second contact, ceasing to display (e.g., with the displaying unit **3310**) the notification on the display unit **3302** of the touch screen device **3300**.

[0486] In some embodiments, the touch screen device comprises a processor unit (e.g., the processing unit **3308**) and memory containing instructions for displaying (e.g., with the displaying unit **3310**) a first pane in an application interface on a display unit (e.g., the display unit **3302**) of the touch screen device **3300**; detecting (e.g., with the detecting unit **3310**), via the at least one elongate touch sensitive strip unit **3322**, a contact followed by a movement of the contact in a direction parallel to the top side of the detachable keyboard **3306**; and in response to detecting the contact followed by the movement of the first, sliding (e.g., with the sliding unit **3314**) a second pane into the display unit **3302** of the touch screen device **3300** in accordance with the direction and movement of the first contact until the second pane replaces the first pane in the application interface on the display unit **3302**, wherein the first pane and the second pane are in a navigational hierarchy specified for the application interface.

[0487] The operations in the information processing methods described above are, optionally implemented by running one or more functional modules in information processing apparatus such as general purpose processors (e.g., as described above with respect to FIGS. **1**A, **3**A-**3**B, and **31**A-**31**B) or application specific chips.

[0488] The operations described above with reference to FIGS. **31**A-**31**B and **32**A-**32**L are, optionally, implemented by components depicted in FIGS. **1**A-**1**B or FIG. **33**. For example, detecting operation **3310**, scrolling operation **3312**, sliding operation **3314**, and displaying operation **3316** are, optionally, implemented by event sorter **170**, event recognizer **180**, and event handler **190**. Event monitor **171** in event sorter **170** detects a contact on touch-sensitive display **112**, and event dispatcher module **174** delivers the event information to application **136-1**. A respective event recognizer **180** of application **136-1** compares the event information to respective event definitions **186**, and determines whether a first contact at a first location on the touch-sensitive surface corresponds to a predefined event or sub-event, such as selection of an object on a user interface. When a respective predefined event or sub-event is detected, event recognizer **180** activates an event handler **190** associated with the detection of the event or sub-event. Event handler **190** optionally utilizes or calls data updater **176** or object updater **177** to update the application internal state **192**. In some embodiments, event handler **190** accesses a respective GUI updater **178** to update what is displayed by the application. Similarly, it would be clear to a person having ordinary skill in the art how other processes can be implemented based on the components depicted in FIGS. **1**A-**1**B.

[0489] Keyboard Arrow Scrolling

[0490] FIGS. **34**A-**34**B are flow charts illustrating a method **3400** of improved keyboard arrow key scrolling, in accordance with some embodiments. FIGS. **35**A-**35**H, which illustrate exemplary user interfaces for arrow key scrolling, are used to illustrate the processes in FIGS. **34**A-**34**B. The method **3400** is performed (**3402**) at a portable multifunction device (e.g., the device **100** in FIG. **1**A) with a touch-sensitive display (e.g., the touch screen display **112** in FIG. **1**A) and a physical keyboard (e.g., the physical keyboard **370** in FIG. **3**B and FIG. **31**A-**31**B) removably coupled to the portable multifunction device. As explained above in connection with FIGS. **3**B and **31**A-**31**B, in some embodiments, the keyboard **370** is communicatively coupled to the portable multifunction device **100** by contact (e.g., Smart Connect from Apple Computer, Inc. of Cupertino, Calif.), via a wired connection (e.g., USB, PS/2), or via a wireless communication link (e.g., optical, Bluetooth, Wi-Fi, or the like). In some embodiments, the physical keyboard is (**3404**) decoupled from the portable multifunction device and connected to an electronic device. For example, the physical keyboard **370** as shown in FIG. **3**B, FIGS. **31**A-**31**B and FIGS. **35**A-**35**H can be connected to a different electronic device that does not have a touch screen. In some embodiments, as shown in FIGS. **31**A-**31**B, one or more contact intensity sensors are coupled to the arrow key for detecting contact intensities of inputs on the arrow key.

[0491] As described below, the method **3400** provides an efficient mechanism for arrow key scrolling using a physical keyboard coupled with a portable multifunction device. This method is faster and easier to perform than conventional methods and systems, e.g., conventional arrow key scrolling using a conventional keyboard. The method is also intuitive for users, thereby reducing the cognitive burden on the user, and creating a more efficient human-machine interface. A more efficient input mechanism also requires less computing resources, thereby increasing battery life of the device.

[0492] The device **100** displays (**3406**) content on the touch screen display. In some embodiments, the content is (**3408**) editable (e.g., the content includes editable text, such as an email in an email composition window) or non-editable (e.g., web content in a browser or a note/email in a non-editable document-display mode). The device then detects (**3410**) an input of an arrow key located on the physical keyboard, where one or more contact intensity sensors are coupled to the arrow key for detecting contact intensities of inputs on the arrow key (e.g., the sensors **374** in FIG. **3**B and/or the sensors **3111** in FIG. **31**B). In response to detecting the input, the device determines (**3412**) whether the input is of a first type or a second type different from the first type. Upon determining that the input is of the first type, the device scrolls (**3414**) the content on the display at a first speed that is faster than a normal scrolling speed; detects a continued contact with the arrow key; and in response to detecting the continued contact with the arrow key, main-

tains the first speed of the scrolling that is faster than the normal scrolling speed. In some embodiments, the first type (**3416**) is a multi-tap on the arrow key, e.g., a double-tap, triple-tap, or quadruple tap, etc.

[0493] For example, in FIG. **35**A, initially, 9 lines of text are displayed on the touch screen **112**, with the first one being on the top of the touch screen **112** and the 9th line being at the bottom. In FIG. **35**B, in response to a single tap on the down arrow key, the device scrolls the text at a normal speed, e.g., the first three lines of text are moved off the display in response to a single stroke. Thus, the normal scrolling speed responsive to the single tap is to move 3 lines between T_0 and T_2.

[0494] It should be noted that in the example shown in FIGS. **35**B and **35**C-**35**H, the notes application is in a non-editing document-display mode, as indicated by the lack of a button labeled "Done." When the content is non-editable, a block of the content, e.g., a block of text containing 3 lines, shown in FIG. **35**B, is moved together. When the content is editable (not shown in the figures), the normal speed of scrolling may be one line for each tap detected on the arrow key.

[0495] FIG. **35**C illustrates that in response to a double-tap on the down arrow, while displaying lines **1-9** of text on the touch screen **112** (FIG. **35**A), the device scrolls the content faster than the normal speed, e.g., scrolling six lines of text between T_0 and T_2. Further, FIGS. **35**B and **35**C show that after T_2, responsive to the continued contact with the arrow key, the device maintains the scrolling speed, e.g., the normal speed of scrolling is maintained in FIG. **35**B and the faster speed is maintained in FIG. **35**C.

[0496] This method for adjusting the scrolling speed in response to different types of input on the arrow key is intuitive for users, thereby reducing the cognitive burden on the user, and creating a more efficient human-machine interface. Conventional methods of content scrolling often move content at a fixed speed and by a fixed distance responsive to each arrow key stroke. In contrast, the methods disclosed herein take into consideration the user's intent and scroll the content at various speeds responsive to different types of inputs. The repetitive pressing of an arrow key, e.g., double, triple, or quadruple tap etc., may indicate that the user wants faster scrolling. Thus, increasing the speed responsive to the multi-tap creates a more efficient human-machine. A more efficient input mechanism also requires less computing resources, thereby increasing battery life of the device.

[0497] Returning to the method **3400**, in FIG. **34**A, upon determining that the input is of the second type, the device determines (**3418**) a contact intensity of the input and scrolls the content on the display at a second speed determined based on the contact intensity of the input. In some embodiments, the second type is a press-and-hold (**3420**) on the arrow key. In such embodiments, the faster scrolling is performed in response to the deep press, as shown in FIGS. **35**D-**35**E. For example, in response to the input **3524-1** on the down arrow while displaying lines **1-9** of text on the touch screen **112** (FIG. **35**A), the device determines whether the input is a light press or a deep press by analyzing the contact intensity of the press. In FIG. **35**D, the device scrolls the text at a first speed upon determining that the input is a light press with the contact intensity at T_1 below IT_D, e.g., scrolling three lines of text between T_0 and T_1. In comparison, in FIG. **35**E, the device scrolls the content at a second speed faster than the first speed upon determining that the input is a deep press with the contact intensity at T_1 above IT_D, e.g., scrolling six lines of text between T_0 and T_1. In some embodiments, the device further detects continued contact with the arrow key with varying contact intensities. In such embodiments, the device adjusts the scrolling speed in accordance with the varying contact intensities. For example, the device scrolls the content in a slow-fast-slow pattern responsive to a continuous press on the arrow key in a pattern of light pressure/more pressure/less pressure on the arrow key.

[0498] Adjusting the scrolling speed in accordance with the force detected by the sensors is intuitive for users, thereby reducing the cognitive burden on the user, and creating a more efficient human-machine interface. For example, when a user wants faster scrolling, the user may press harder on the key. Thus, the more efficient scrolling mechanism requires less computing resources, thereby increasing battery life of the device.

[0499] Returning to the method **3400**, in FIG. **34**B, in some embodiments, when the device subsequently detects (**3422**) a lift-off of the input, the device continues to scroll the content on the display with gradually decreasing speed. For example, in FIG. **35**F, between T_0 and T_2, the input remains in contact with the arrow key as indicated by the contact intensity above zero. In response to detecting the input on the arrow key, the device scrolls the text while the input remains in contact with the arrow key. At T_2, a lift-off of the input is detected, as indicated by the contact intensity decreasing to zero, and after the lift-off is detected, the device continues to scroll the text at a decreasing speed, e.g., further scrolling from line **4** to line **7** after T_2 before the scrolling stops.

[0500] Providing scrolling with this inertia effect is intuitive for users, e.g., like a user taking their foot of an accelerator pedal of a vehicle and the car rolling slowly to rest. This reduces the cognitive burden on the user and creates a more efficient human-machine interface. A more efficient input mechanism also requires less computing resources, thereby increasing battery life of the device.

[0501] Referring back to the method **3400**, in FIG. **34**B, in some embodiments, the device stretches or expands (**3424**) the content (e.g., expands the line spacing of the content as described below), before scrolling the content on the display. In some embodiments, the expanding is performed regardless of the input contact intensity. In some embodiments, the expanding is performed when the contact intensity exceeds a predetermined threshold. For example, in FIG. **35**G, between T_0 and T_1, the contact intensity is below IT_D, indicating the input is a light press on the arrow key. In response to detecting the light press, the device scrolls at a first speed, e.g., scrolling approximately two lines of the content between T_0 and T_1, such that line **3** is displayed at the top of the touch screen **112** and line **11** is displayed at the bottom of the touch screen **112**. At T_1, the contact intensity increases above ITD, indicating a deep press on the arrow key. In response to detecting the deep press, the device expands the content before scrolling the content, as described in further detail below.

[0502] In some embodiments, the expanding is implemented by increasing the line spacing between the lines until the threshold pressure is reached, and thereafter the entire text scrolls as normal. Based on a direction associated with the arrow key, one or more lines are moved in the direction

associated with the arrow key to make room for the increased line spacing. The combination of line movement and the increase in line spacing creates the visual effect of stretching the content. For example, in FIG. **35**G, at T_1, prior to detecting the deep press, line **3** on the display has been moved up and off of the touch screen display **112** while line **11** at the bottom of the display **112** remains stationary. The device increases the line spacing prior to scrolling the content to create the visual effect of stretching or expanding the displayed content. After T_1, where the intensity threshold has been met, the device scrolls the content with the line space shrinking back to normal. Though FIG. **35**G illustrates expanding the content by increasing line spacing and line moving, in some embodiments, the expanding is accomplished by increasing the size of images and/or font of text.

[0503] Stretching the content before scrolling provides a natural scrolling experience, and provides feedback to the user that scrolling will occur. This method is intuitive for users, thereby reducing the cognitive burden on the user, and creating a more efficient human-machine interface. A more efficient input mechanism also requires less computing resources, thereby increasing battery life of the device.

[0504] Referring back to the method **3400**, in FIG. **34**B, in some embodiments, the device detects (**3426**) an increase in contact intensity of the input; and in response to detecting the increase of the contact intensity of the input, increases the first or second speed proportional to the increase of the contact intensity. For example, in FIG. **35**H, the contact intensity of the input at T_2 is approximately twice the intensity at $_1$. As a result, between T_0 and T_1, the device scrolls at a slower speed, e.g., approximately three lines of the content between T_0 and T_1. At T_2, in response to the intensity increase, the device scrolls at a faster speed, scrolling approximately ten lines between T_1 and T_2.

[0505] Adjusting the scrolling speed proportionate to the force detected by the sensors is intuitive for users, thereby reducing the cognitive burden on the user, and creating a more efficient human-machine interface. For example, when a user wants twice the speed of scrolling, the user may press twice as hard on the key. Thus, the more efficient scrolling mechanism requires less computing resources, thereby increasing battery life of the device.

[0506] It should be understood that the particular order in which the operations in FIGS. **34**A-**34**B have been described is merely exemplary and is not intended to indicate that the described order is the only order in which the operations could be performed. One of ordinary skill in the art would recognize various ways to reorder the operations described herein. For brevity, these details are not repeated here.

[0507] In accordance with some embodiments, FIG. **36** shows a functional block diagram of a portable multifunction device **3600** configured in accordance with the principles of the various described embodiments. The functional blocks of the device are, optionally, implemented by hardware, software, or a combination of hardware and software to carry out the principles of the various described embodiments. It is understood by persons of skill in the art that the functional blocks described in FIG. **36** are, optionally, combined or separated into sub-blocks to implement the principles of the various described embodiments. Therefore, the description herein optionally supports any possible combination or separation or further definition of the functional blocks described herein.

[0508] As shown in FIG. **36**, a portable multifunction device **3600** includes a touch-sensitive display unit **3602** configured to display user interfaces (editable content on the display unit) and configured to detect touch inputs (contacts), and a processing unit **3608** coupled with the touch-sensitive display unit **3602**. In some embodiments, the portable multifunction device includes one or more sensor units **3604** and the processing unit **3608** is coupled with the touch-sensitive display unit **3602** and the one or more sensor units **3604**. In some embodiments, processing unit **3608** includes one or more of the following sub-units: displaying unit **3610**, detecting unit **3612**, determining unit **3614**, scrolling unit **3616**, and expanding unit **3618**. In some embodiments, the portable multifunction device **3600** is removably coupled to a physical keyboard unit **3606** (e.g., the physical keyboard **370**), which further includes one or more sensor units **3607** (e.g., the sensors **374**, FIG. **3**B).

[0509] The processing unit **3608** is configured to detect (e.g., with the detecting unit **3612**) an input of an arrow key located on the physical keyboard unit **3606**, where one or more contact intensity sensor units **3607** are coupled to the arrow key for detecting contact intensities of inputs on the arrow key. In response to detecting the input, the processing unit **3608** is configured to determine (e.g., with the determining unit **3614**) whether the input is of a first type or a second type different from the first type. Upon determining that the input is of the first type, the processing unit **3608** is configured to scroll (e.g., with the scrolling unit **3616**) the content on the touch screen display unit **3602** at a first speed faster than a normal scrolling speed. When the input is of the first type, the processing unit **3608** is further configured to detect (e.g., with the detecting unit **3612**) a continued contact with the arrow key, and in response to detecting the continued contact with the arrow key, maintain (e.g., with the scrolling unit **3616**) the first speed of the scrolling faster than the normal scrolling speed. On the other hand, upon determining that the input is of the second type, the processing unit **3608** is configured to determine (e.g., with the determining unit **3614**) a contact intensity of the input and scroll (e.g., with the scrolling unit **3616**) the content on the display at a second speed determined based on the contact intensity of the input.

[0510] In some embodiments, the physical keyboard unit **3606** is decoupled from the portable multifunction device and connected to an electronic device.

[0511] In some embodiments, the content is editable or non-editable.

[0512] In some embodiments, the first type is a multi-tap on the arrow key.

[0513] In some embodiments, the second type is a press-and-hold on the arrow key.

[0514] In some embodiments, the processing unit **3608** is further configured to detect (e.g., with the detecting unit **3612**) a lift-off of the input. In response to detecting the lift-off, the processing unit **3608** is further configured to continue to scroll (e.g., with the scrolling unit **3616**) the content on the touch screen display unit **3602** with gradual decreasing speed after detecting (e.g., with the detecting unit **3612**) the lift-off of the input. In some embodiments, the processing unit **3608** is further configured to expand (e.g., with the expanding unit **3618**) the content before scrolling (e.g., with the scrolling unit **3616**) the content on the touch screen display unit **3602**. In some embodiments, the processing unit **3608** is further configured to detect (e.g., with

the detecting unit **3612**) an increase of contact intensity of the input. In response to detecting the increase of the contact intensity of the input, the processing unit **3608** is configured to increase (e.g., with the scrolling unit **3616**) the first or second speed proportional to the increase of the contact intensity.

[0515] The operations in the information processing methods described above are, optionally implemented by running one or more functional modules in information processing apparatus such as general purpose processors (e.g., as described above with respect to FIGS. **1**A and **3**A-**3**B) or application specific chips.

[0516] The operations described above with reference to FIGS. **35**A-**35**H are, optionally, implemented by components depicted in FIGS. **1**A-**1**B or FIG. **36**. For example, displaying operation **3610**, detecting operation **3612**, determining operation **3614**, scrolling operation **3616**, and expanding operation **3618** are, optionally, implemented by event sorter **170**, event recognizer **180**, and event handler **190**. Event monitor **171** in event sorter **170** detects a contact on touch-sensitive display **112**, and event dispatcher module **174** delivers the event information to application **136-1**. A respective event recognizer **180** of application **136-1** compares the event information to respective event definitions **186**, and determines whether a first contact at a first location on the touch-sensitive surface corresponds to a predefined event or sub-event, such as selection of an object on a user interface. When a respective predefined event or sub-event is detected, event recognizer **180** activates an event handler **190** associated with the detection of the event or sub-event. Event handler **190** optionally utilizes or calls data updater **176** or object updater **177** to update the application internal state **192**. In some embodiments, event handler **190** accesses a respective GUI updater **178** to update what is displayed by the application. Similarly, it would be clear to a person having ordinary skill in the art how other processes can be implemented based on the components depicted in FIGS. **1**A-**1**B.

[0517] Inchworm Movement

[0518] FIG. **37** is a flow chart illustrating a method **3700** of text scrolling using an arrow key, in accordance with some embodiments. FIGS. **38**A-**38**B, which illustrate exemplary user interfaces for arrow key scrolling, are used to illustrate the processes in FIG. **37**. The method **3700** is performed (**3702**) at a portable multifunction device (e.g., the device **100** in FIG. **1**A) with a touch-sensitive display (e.g., the touch screen display **112** in FIG. **1**A) and a physical keyboard (e.g., the physical keyboard **370** in FIG. **3**B) removably coupled to the portable multifunction device. As explained above in connection with FIGS. **3**B and **31**A-**31**B, in some embodiments, the keyboard **370** is communicatively coupled to the portable multifunction device **100** by contact (e.g., Smart Connect from Apple Computer, Inc. of Cupertino, Calif.), via a wired connection (e.g., USB, PS/2), or via a wireless communication link (e.g., optical, Bluetooth, Wi-Fi, or the like). In some embodiments, the physical keyboard is (**3704**) decoupled from the portable multifunction device and connected to an electronic device. For example, the physical keyboard **370** as shown in FIG. **3**B and FIGS. **31**A-**31**B can be connected to a different electronic device that does not have a touch screen. In some embodiments, as shown in FIGS. **31**A-**31**B, one or more contact intensity sensors are coupled to the arrow key for detecting contact intensities of inputs on the arrow key.

[0519] As described below, the method **3700** provides an efficient and intuitive mechanism for scrolling content using an arrow key on a physical keyboard coupled with a portable multifunction device. The method changes how scrolling behaves by moving portions of chunks of content together. The visual effect is an inchworm-like motion, where the content appears to double-up on itself at intervals, then stretch itself straight again when advancing. The scrolling behavior of keeping chunks together reduces the cognitive burden on the user, and creates a more efficient human-machine interface. A more efficient input mechanism also requires less computing resources, thereby increasing battery life of the device.

[0520] The device **100** displays (**3706**) content of an electronic document on the display, the content includes a first portion displayed at a first location and a second portion displayed at a second location adjacent to the first location. The content is (**3708**) editable (e.g., the content includes editable text, such as an email in an email composition window) or non-editable (e.g., the content is web content in a browser). In some embodiments, the first portion and the second portion are (**3710**) paragraphs, lines, or images.

[0521] For example, FIG. **38**A illustrates a portion of an email application interface. Initially, a first paragraph of an email with the text "Sleep/Wake button" is displayed in the partial email application interface at a first location **3802-1**. Below the first paragraph, a second paragraph with the text "Use the Sleep/Wake button to . . . " is displayed at a second location **3802-2** adjacent the first paragraph. These paragraphs can be editable or non-editable.

[0522] Referring back to FIG. **37**, the device then detects (**3712**) an input of an arrow key located on the physical keyboard. In response to detecting the input, the device moves (**3714**) the first portion to a third location in a direction associated with the arrow key, while maintaining the second portion stationary at the second location; and subsequent to moving the first portion, moves the second portion to a fourth location in a direction associated with the arrow key, while maintaining the first portion stationary at the third location.

[0523] For example, in FIG. **38**A, the device detects an input **3824-1**, e.g., a tap on the arrow key. In response to detecting the tap input, the device scrolls the content displayed in the email application interface by first moving the first paragraph "Sleep/Wake button" to a third location **3802-3** while maintaining the second paragraph "Use the Sleep/Wake button . . . " stationary at the second location **3802-2**. Subsequently, as shown in FIG. **38**B, after moving the first paragraph to the third location **3802-3**, the device moves the second paragraph to a fourth location **3802-4** while maintaining the first paragraph stationary at the third location **3802-3**, such that after the move, the spacing between the first paragraph and the second paragraph is the same as the initial spacing between these two paragraphs prior to the moves.

[0524] In some embodiments, one or more contact intensity sensors are coupled to (**3716**) the arrow key for detecting contact intensities of inputs on the arrow key, and the device further detects an increase of a contact intensity of the input. In response to detecting the increase of the contact intensity of the input, the speed of moving the first and/or second portions is increased at a rate proportionate to the increase of the contact intensity.

[0525] It should be understood that the particular order in which the operations in FIG. **37** have been described is merely exemplary and is not intended to indicate that the described order is the only order in which the operations could be performed. One of ordinary skill in the art would recognize various ways to reorder the operations described herein. For brevity, these details are not repeated here.

[0526] In accordance with some embodiments, FIG. **39** shows a functional block diagram of a portable multifunction device **3900** configured in accordance with the principles of the various described embodiments. The functional blocks of the device are, optionally, implemented by hardware, software, or a combination of hardware and software to carry out the principles of the various described embodiments. It is understood by persons of skill in the art that the functional blocks described in FIG. **39** are, optionally, combined or separated into sub-blocks to implement the principles of the various described embodiments. Therefore, the description herein optionally supports any possible combination or separation or further definition of the functional blocks described herein.

[0527] As shown in FIG. **39**, a portable multifunction device **3900** includes a touch-sensitive display unit **3902** configured to display user interfaces (editable content on the display unit) and configured to detect touch inputs (contacts), and a processing unit **3908** coupled with the touch-sensitive display unit **3902**. In some embodiments, the portable multifunction device includes one or more sensor units **3904** and the processing unit **3908** is coupled with the touch-sensitive display unit **3902** and the one or more sensor units **3904**. In some embodiments, processing unit **3908** includes one or more of the following sub-units: displaying unit **3910**, detecting unit **3912**, moving unit **3914**, and maintaining unit **3916**. In some embodiments, the portable multifunction device **3900** is removably coupled to a physical keyboard unit **3906** (e.g., the physical keyboard **370**), which further includes one or more sensor units **3907** (e.g., the sensors **374**, FIG. **3**B).

[0528] The processing unit **3908** is configured to detect (e.g., with the detecting unit **3912**) an input on an arrow key located on the keyboard. In response to detecting the input: the processing unit **3908** is configured to move (e.g., with the moving unit **3914**) the first portion to a third location in a direction associated with the arrow key, while maintaining the second portion stationary at the second location. Subsequent to moving the first portion, the processing unit **3908** is configured to move (e.g., with the moving unit **3914**) the second portion to a fourth location in a direction associated with the arrow key, while maintaining (e.g., with the maintaining unit **3916**) the first portion stationary at the third location.

[0529] In some embodiments, the physical keyboard unit **3906** is decoupled from the portable multifunction device and connected to an electronic device.

[0530] In some embodiments, the content is editable or non-editable.

[0531] In some embodiments, the first portion and the second portion are paragraphs, lines, or images.

[0532] In some embodiments, one or more contact intensity sensor units (e.g., the sensor units **3907**) are coupled to the arrow key for detecting contact intensities of inputs on the arrow key, and the processing unit **3908** is further configured to detect (e.g., with the detecting unit **3912**) an increase of a contact intensity of the input; and in response to detecting the increase of the contact intensity of the input, the processing unit **3908** is configured to increase (e.g., with the moving unit **3914**) a speed of moving the first or second portion proportionate to the increase of the contact intensity.

[0533] The operations in the information processing methods described above are, optionally implemented by running one or more functional modules in information processing apparatus such as general purpose processors (e.g., as described above with respect to FIGS. **1**A and **3**A-**3**B) or application specific chips.

[0534] The operations described above with reference to FIGS. **38**A-**38**B are, optionally, implemented by components depicted in FIGS. **1**A-**1**B or FIG. **39**. For example, displaying operation **3910**, detecting operation **3912**, moving operation **3914**, and maintaining operation **3916** are, optionally, implemented by event sorter **170**, event recognizer **180**, and event handler **190**. Event monitor **171** in event sorter **170** detects a contact on touch-sensitive display **112**, and event dispatcher module **174** delivers the event information to application **136-1**. A respective event recognizer **180** of application **136-1** compares the event information to respective event definitions **186**, and determines whether a first contact at a first location on the touch-sensitive surface corresponds to a predefined event or sub-event, such as selection of an object on a user interface. When a respective predefined event or sub-event is detected, event recognizer **180** activates an event handler **190** associated with the detection of the event or sub-event. Event handler **190** optionally utilizes or calls data updater **176** or object updater **177** to update the application internal state **192**. In some embodiments, event handler **190** accesses a respective GUI updater **178** to update what is displayed by the application. Similarly, it would be clear to a person having ordinary skill in the art how other processes can be implemented based on the components depicted in FIGS. **1**A-**1**B.

[0535] Switching Between Virtual Keyboards

[0536] FIG. **40** is a flow chart illustrating a method **4000** for switching between virtual keyboards, in accordance with some embodiments. FIGS. **41**A-**41**N, which illustrates exemplary user interfaces for switching between virtual keyboards, are used to illustrate the processes in FIG. **40**. The method **4000** is performed at a portable multifunction device (e.g., the device **100** in FIG. **1**A) with a touch-sensitive display (e.g., the touch screen **112** in FIG. **1**A). As described below, the method **4000** provides an efficient mechanism for seamlessly switching between multiple virtual keyboards. This method is faster, easier to perform, and makes more efficient use of the display area than conventional methods that require the application to display an alternative keyboard affordance for selection by a user, which consumes valuable display screen space. The method is also intuitive for users, thereby reducing the cognitive burden on the user when selecting content, and creating a more efficient human-machine interface. A more efficient input mechanism also requires less computing resources, thereby increasing battery life of the device.

[0537] The device **100** displays (**4002**) a first virtual keyboard of a first size on the display. In some embodiments, the first virtual keyboard is (**4004**) a QWERTY keyboard, a foreign language keyboard, an emoji keyboard, a drawing pad, or a photo album. For example, in FIG. **41**A, an instant messenger application is displayed on device **100**. The instant messenger application includes a QWERTY key-

board **4102** at full-scale to allow a user to provide inputs to the instant messenger application.

[0538] In response to detecting a pre-defined gesture on the display, the device **100** concurrently displays (**4006**) multiple keyboards, including the first keyboard reduced to a second size smaller than the first size. In some embodiments, each of the multiple keyboards is (**4008**) a QWERTY keyboard, a foreign language keyboard, an emoji keyboard, a drawing pad, or a photo album. For example, FIG. **41**C depicts a QWERTY keyboard **4102**, an emoji keyboard **4106**, a drawing pad **4111**, and a photo album **4108**. In some embodiments, the multiple keyboards are (**4010**) displayed in a grid. For example, FIG. **41**C depicts a QWERTY keyboard **4102**, an emoji keyboard **4106**, a drawing pad **4111**, and a photo album **4108** in a grid pattern. In some embodiments, the multiple keyboards are (**4012**) displayed in a scrollable list. For example, in FIGS. **41**H-**41**I, the device **100** displays a series of keyboards (e.g., emoji keyboard **4106**, and a photo album **4111**) in a list that is scrollable via a swipe gesture (e.g., swipe gesture **4116**).

[0539] In some embodiments, the pre-defined gesture is (**4014**) a pinch or a deep press. For example, in FIG. **41**B, the device **100** detects a pinch gesture **4104**. In response, the device **100** begins shrinking the QWERTY keyboard **4102** to a reduced-scale representation to provide space for a display of other keyboards. In FIG. **41**C, the device **100** continues to detect the pinch gesture **4104**. In response, the device **100** concurrently displays a QWERTY keyboard **4102**, along with emoji keyboard **4106**, a photo album **4108** and a drawing pad **4111**, in a reduced-scale grid pattern. In FIG. **41**D, after termination of the pinch gesture, the device **100** enlarges the concurrently displayed QWERTY keyboard **4102**, emoji keyboard **4106**, a photo album **4108** and a drawing pad **4111**, into a full-scale grid pattern.

[0540] In some embodiments, the pre-defined gesture is (**4016**) a swipe from an edge of the first keyboard. For example, in FIG. **41**K, an email application interface is displayed with a QWERTY keyboard **4102** as the virtual keyboard. In FIG. **41**L, the device **100** detects a leftward swipe **4120** starting from the right edge of the virtual keyboard **4102**. In response, as shown in FIG. **41**M, the device **100** slides the QWERTY keyboard **4102** off the display from the left (i.e., toward the right edge of the display). In addition, the device **100** slides the emoji keyboard **4106** adjacent the QWERTY keyboard into the display from the left, toward the right edge of the display (FIG. **41**N).

[0541] Referring back to FIG. **40**, in some embodiments, the pre-defined gesture is (**4018**) an initial contact within a predefined region on the display followed by a movement of the contact on the display in a pre-defined direction. In such embodiments, currently displaying the multiple keyboards, including the first keyboard reduced to a second size smaller than the first size includes (**4020**): moving the first keyboard off the display in a direction associated with the pre-defined gesture; and moving a second keyboard of the multiple keyboards in the direction onto the display.

[0542] For example, in FIGS. **41**F-**41**G, the gesture **4114** is an initial contact in the input area of the messenger user interface followed by a movement of the contact in a direction away from the virtual keyboard **4102**. For example, in FIG. **41**F, an instant messenger application is displayed on device **100**. The instant messenger application includes a QWERTY keyboard **4102** at a full-scale representation to allow a user to provide inputs to the instant messenger application. The device **100** detects an input **4114** that includes an initial contact in the input area of the messenger interface. The input area is located above the virtual keyboard **4102**. The initial contact is followed by movement of the contact in a direction away from the virtual keyboard **4102**, e.g., in an upward direction. In response, the input area is pulled upward to create the visual effect that more space is provided for keyboard switching. Further, as shown in FIG. **41**G, the device **100** shrinks the QWERTY keyboard **4102** to a reduced-scale representation for a display of other reduced-scale representation keyboards, such as emoji keyboard **4106**. In FIG. **41**H, while displaying portions of QWERTY keyboard **4102** and emoji keyboard **4106** the device **100** detects a leftward swipe gesture **4116** at emoji keyboard **4106**. In response, as shown in FIG. **41**I, the device **100** slides QWERTY keyboard **4102** to the left and out of the display. In addition, the device **100** slides the emoji keyboard **4106** to the left into the display. Lastly, the device **100** slides a portion of a photo album **4108** into the display.

[0543] Referring back to FIG. **40**, the device **100** detects (**4022**) a selection of one of the multiple keyboards. In some embodiments, the selection is a light press, a deep press, a tap gesture, a pinch gesture, a press-and-hold gesture, or a tap gesture at one of the multiple keyboards. Once a keyboard is selected, the device **100** ceases (**4024**) to display the multiple keyboards and displays (**4026**) the selected one of the multiple keyboards on the display at the first size. For example, in FIGS. **41**D-**41**E and **41**H-**41**J, the device displays an emoji keyboard **4106** at full-scale in response to tap gesture **4112**.

[0544] It should be understood that the particular order in which the operations in FIG. **40** have been described is merely exemplary and is not intended to indicate that the described order is the only order in which the operations could be performed. One of ordinary skill in the art would recognize various ways to reorder the operations described herein. For brevity, these details are not repeated here.

[0545] In accordance with some embodiments, FIG. **42** shows a functional block diagram of an electronic device **4200** configured in accordance with the principles of the various described embodiments. The functional blocks of the device are, optionally, implemented by hardware, software, or a combination of hardware and software to carry out the principles of the various described embodiments. It is understood by persons of skill in the art that the functional blocks described in FIG. **42** are, optionally, combined or separated into sub-blocks to implement the principles of the various described embodiments. Therefore, the description herein optionally supports any possible combination or separation or further definition of the functional blocks described herein.

[0546] As shown in FIG. **42**, an electronic device **4200** includes a touch-sensitive display unit **4202** configured to receive user inputs and display user interfaces and a processing unit **4208** coupled to the touch-sensitive display unit **4202**. In some embodiments, the processing unit **4208** includes a display enabling unit **4210** and a detecting unit **4212**.

[0547] In some embodiments, the processing unit **4208** is configured to display a first virtual keyboard of a first size on the display unit **4202** (e.g., with the display enabling unit **4210**). In response to detecting a pre-defined gesture on the

display unit **4202** (e.g., with the detecting unit **4212**), the processing unit **4208** is configured to concurrently display multiple keyboards, including the first keyboard reduced to a second size smaller than the first size (e.g., with the display enabling unit **4210**). The processing unit **4208** is further configured to detect a selection of one of the multiple keyboards (e.g., with the detecting unit **4212**), cease to display the multiple keyboards (e.g., with the display enabling unit **4210**), and display the selected one of the multiple keyboards on the display unit **4202** at the first size (e.g., with the display enabling unit **4210**).

[0548] In some embodiments, the first virtual keyboard is a QWERTY keyboard, a foreign language keyboard, an emoji keyboard, a drawing pad, or a photo album.

[0549] In some embodiments, the each of the multiple keyboards is a QWERTY keyboard, a foreign language keyboard, an emoji keyboard, a drawing pad, or a photo album. In some embodiments, the multiple keyboards are displayed in a grid. In some embodiments, the multiple keyboards are displayed in a scrollable list. In some embodiments, the pre-defined gesture is a pinch or a deep press. In some embodiments, the pre-defined gesture is a swipe from an edge of the first keyboard.

[0550] In some embodiments, currently enabling display of the multiple keyboards, including the first keyboard reduced to a second size smaller than the first size includes moving the first keyboard out of the display unit **4202** in a direction associated with the pre-defined gesture; and moving a second keyboard of the multiple keyboards in the direction into the display unit **4202**.

[0551] In some embodiments, the pre-defined gesture is an initial contact within a predefined region on the display unit **4202** followed by a movement of the contact on the display unit **4202** in a pre-defined direction.

[0552] The operations in the information processing methods described above are, optionally implemented by running one or more functional modules in information processing apparatus such as general purpose processors (e.g., as described above with respect to FIGS. **1**A and **3**A-**3**B) or application specific chips.

[0553] The operations described above with reference to FIGS. **41**A-**41**N are, optionally, implemented by components depicted in FIGS. **1**A-**1**B or FIG. **42**. For example, displaying enabling operation **4210** and detecting operation **4212** are, optionally, implemented by event sorter **170**, event recognizer **180**, and event handler **190**. Event monitor **171** in event sorter **170** detects a contact on touch-sensitive display **112**, and event dispatcher module **174** delivers the event information to application **136-1**. A respective event recognizer **180** of application **136-1** compares the event information to respective event definitions **186**, and determines whether a first contact at a first location on the touch-sensitive surface corresponds to a predefined event or sub-event, such as selection of an object on a user interface. When a respective predefined event or sub-event is detected, event recognizer **180** activates an event handler **190** associated with the detection of the event or sub-event. Event handler **190** optionally utilizes or calls data updater **176** or object updater **177** to update the application internal state **192**. In some embodiments, event handler **190** accesses a respective GUI updater **178** to update what is displayed by the application. Similarly, it would be clear to a person having ordinary skill in the art how other processes can be implemented based on the components depicted in FIGS. **1**A-**1**B.

[0554] Virtual Keyboard Without Shift Key

[0555] FIG. **43** is a flow chart illustrating a method **4300** for switching between different sets of characters (e.g., lower case and upper case characters) on a virtual keyboard, in accordance with some embodiments. FIGS. **44**A-**44**G, which illustrate exemplary user interfaces for switching between different sets of characters on a virtual keyboard, are used to illustrate the processes in FIG. **43**. The method **4300** is performed at a portable multifunction device (e.g., the device **100** in FIG. **1**A) with a touch-sensitive display (e.g., the touch screen **112** in FIG. **1**A). As described below, the method **4300** provides an efficient mechanism for seamlessly switching between different sets of characters on a virtual keyboard using a single user input. This method is faster, easier to perform, and more efficiently uses display area, as compared to conventional methods that require the application to display an affordance for selection by a user to switch between different sets of characters, which consumes valuable display screen space. The method is also intuitive for users, thereby reducing the cognitive burden on the user when selecting content, and creating a more efficient human-machine interface. A more efficient input mechanism also requires less computing resources, thereby increasing battery life of the device.

[0556] The device **100** displays (**4302**) on a display a virtual keyboard (e.g., QWERTY keyboard **4402** in FIG. **44**A) without a shift key, wherein keys on the keyboard have a first appearance. In some embodiments, the first appearance may be lower case characters (e.g., as shown in FIG. **44**A), upper case characters (e.g., as shown in FIG. **44**D), or a first set of emoji characters.

[0557] The device **100** detects (**4304**) a contact at a location on the virtual keyboard followed by a change in the input, e.g., a movement of the contact in a direction. In some embodiments, the contact is a swipe gesture, or a deep press gesture. For example, as shown in FIG. **44**B, the contact is an upward swipe gesture **4404**. In response to detecting the contact at the location on the virtual keyboard followed by the movement of the contact in the direction, the device **100** changes (**4306**) the appearance of the keys on the keyboard to a second appearance different from the first appearance.

[0558] For example, FIGS. **44**A-**44**D illustrate exemplary user interfaces for switching between a set of lower case characters to a set of upper case characters on a virtual keyboard. In FIG. **44**A, an email application is displayed on device **100**. The email application includes a QWERTY keyboard **4402** to allow a user to provide inputs to the email application. QWERTY keyboard **4402** displays a set of lower case characters on the keys. In FIG. **44**B, the device **100** detects an upward swipe gesture **4404** at the QWERTY keyboard **4402**, e.g., at the lower case "a" key. In response, as shown in FIG. **44**C-**44**D, the device **100** changes the appearance of the characters on the QWERTY keyboard **4402** from displaying the set of lower case characters to displaying a set of upper case characters.

[0559] In some embodiments, the change of the display is animated. For example, starting with the lower case "a" key, the device **100** begins to "flip" the lower case "a" key to reveal an upper case "A" key (similar to flipping over a playing card). The device **100** then begins to sequentially "flip" the other lower case keys on the QWERTY keyboard

4402 to reveal the corresponding upper case keys underneath, in an order based on each key's distance from the upward swipe gesture **4404**. This animation gives the appearance of a "ripple effect" over the keys of the QWERTY keyboard **4402**. At the completion of the animation, as shown in FIG. **44**D, the device **100** displays the set of upper case characters on the QWERTY keyboard **4402**.

[0560] In some embodiments, the second appearance may be lower case characters (e.g., as shown in FIG. **44**A), upper case characters (e.g., as shown in FIG. **44**D), or a second set of characters, e.g., emoji characters. For example, in response to an upward swipe gesture, as shown in FIG. **44**B, the device **100** changes the appearance of the keys on the QWERTY keyboard **4402** from lower case characters (e.g., as shown in FIG. **44**A) to upper case characters (e.g., as shown in FIG. **44**D).

[0561] Referring back to FIG. **43**, in some embodiments, changing the appearance of the keys on the keyboard to the second appearance different from the first appearance includes (**4308**): animating a key closest to the location by flipping a respective first appearance of the key in the direction to reveal the second appearance; and flipping other keys on the virtual keyboard by flipping a respective first appearance of the other keys to reveal the second appearance of the other keys. For example, in FIG. **44**C, the lower case "a" key, which is closest to the upward swipe gesture **4404** "flips" in an upward direction to reveal the upper case "A" key underneath. As another example, in FIG. **44**E, the lower case "i" key, which is closest to the upward swipe gesture **4404** "flips" in an upward direction to reveal the upper case "I" key underneath.

[0562] In some embodiments, flipping other keys on the virtual keyboard includes (**4310**): sequentially flipping the other keys on the virtual keyboard based on a distance between each of the other keys and the key closest to the gesture. In other words, the timing of each key flip may be different depending on the distance from the key where the contact is detected. For example, in FIG. **44**C, the middle row of the QWERTY keyboard **4402** contains keys "a", "s", "d", "f" etc. from left to right. The contact **4404** is on the lower case "a" key. In response to detecting the upward swipe gesture **4404**, the lower case "a" key is flipped first, followed by lower case "s" key, then lower case "d" key, etc. Similarly, among the keys in the top row of the QWERTY keyboard **4402**, keys "e" and "r" are further away from the "a" key than keys "q" and "w". Thus, key "e" is flipped after flipping the key "q" and "w" and key "r" is flipped after the lower case "e" key. In other embodiments, the timing of the key flips is sequential, e.g., starting from the upper left of the keyboard and ending at the lower right of the keyboard.

[0563] In some embodiments, the direction is (**4312**) upward; the first appearance is lower case; and the second appearance is upper case. For example, as shown in FIG. **44**B-**44**D, in response to upward swipe gesture **4404**, the device **100** changes the QWERTY keyboard keys from lower case keys to upper case keys.

[0564] In some embodiments, the direction is (**4314**) downward; the first appearance is upper case; and the second appearance is lower case. For example, as shown in FIG. **44**E-**44**G, in response to downward swipe gesture **4406**, the device **100** changes the QWERTY keyboard keys from upper case keys to lower case keys. In FIG. **44**E, the device **100** displays the set of upper case characters on the QWERTY keyboard **4402**. In FIG. **44**E, the device **100** detects a downward swipe gesture **4406** at the QWERTY keyboard **4402** and specifically the upper case "I" key. In response, as shown in FIGS. **44**E-**44**F, the device **100** changes the appearance of the characters on the QWERTY keyboard **4402** from displaying the set of upper case characters to displaying the set of lower case characters. Starting with the upper case "I" key, the device **100** begins to "flip" a previously hidden lower case "i" key to cover the upper case "I" key, similar to flipping a playing card. The device **100** then begins to sequentially "flip" other lower case keys on the QWERTY keyboard **4402** corresponding to their upper case counterparts to cover the upper case keys on the QWERTY keyboard **4402**. In this example, the lower case keys are "flipped" in an order based on each upper case key's distance from the downward swipe gesture **4406**. This animation gives the appearance of a "ripple effect." At the completion of the animation, as shown in FIG. **44**G, the device **100** displays the set of lower case characters on the QWERTY keyboard **4402**.

[0565] It should be understood that the particular order in which the operations in FIG. **43** have been described is merely exemplary and is not intended to indicate that the described order is the only order in which the operations could be performed. One of ordinary skill in the art would recognize various ways to reorder the operations described herein. For brevity, these details are not repeated here.

[0566] In accordance with some embodiments, FIG. **45** shows a functional block diagram of an electronic device **4500** configured in accordance with the principles of the various described embodiments. The functional blocks of the device are, optionally, implemented by hardware, software, or a combination of hardware and software to carry out the principles of the various described embodiments. It is understood by persons of skill in the art that the functional blocks described in FIG. **45** are, optionally, combined or separated into sub-blocks to implement the principles of the various described embodiments. Therefore, the description herein optionally supports any possible combination or separation or further definition of the functional blocks described herein.

[0567] As shown in FIG. **45**, an electronic device **4500** includes a touch-sensitive display unit **4502** configured to receive user inputs and display user interfaces and a processing unit **4508** coupled to the touch-sensitive display unit **4502**. In some embodiments, the processing unit **4508** includes a display enabling unit **4510**, a detecting unit **4512**, and a changing unit **4514**.

[0568] In some embodiments, the processing unit **4508** is configured to display on the display unit **4502** a virtual keyboard without a shift key, where keys on the keyboard have a first appearance (e.g., with the display enabling unit **4510**). The processing unit **4508** is further configured to detect a contact at a location on the virtual keyboard followed by a movement of the contact in a direction (e.g., with the detecting unit **4512**). In response to detecting the contact at the location on the virtual keyboard followed by the movement of the contact in the direction, the processing unit **4508** is configured to change the appearance of the keys on the keyboard to a second appearance different from the first appearance (e.g., with the changing unit **4514**).

[0569] In some embodiments, changing the appearance of the keys on the keyboard to the second appearance different from the first appearance includes animating a key closest to the location by flipping a respective second appearance of

the key in the direction to reveal the first appearance of the key; and flipping other keys on the virtual keyboard by flipping a respective second appearance of the other keys in the direction to reveal the first appearance of the other keys.

[0570] In some embodiments, flipping other keys on the virtual keyboard includes sequentially flipping the other keys on the virtual keyboard based on a distance between each of the other key and the key. In some embodiments, the direction is upward; the first appearance is lower case; and the second appearance is upper case. In some embodiments, the direction is downward; the first appearance is upper case; and the second appearance is lower case.

[0571] The operations in the information processing methods described above are, optionally implemented by running one or more functional modules in information processing apparatus such as general purpose processors (e.g., as described above with respect to FIGS. **1**A and **3**A-**3**B) or application specific chips.

[0572] The operations described above with reference to FIGS. **44**A-**44**G are, optionally, implemented by components depicted in FIGS. **1**A-**1**B or FIG. **45**. For example, display enabling operation **4210**, detecting operation **4212**, and changing operation **4514** are, optionally, implemented by event sorter **170**, event recognizer **180**, and event handler **190**. Event monitor **171** in event sorter **170** detects a contact on touch-sensitive display **112**, and event dispatcher module **174** delivers the event information to application **136-1**. A respective event recognizer **180** of application **136-1** compares the event information to respective event definitions **186**, and determines whether a first contact at a first location on the touch-sensitive surface corresponds to a predefined event or sub-event, such as selection of an object on a user interface. When a respective predefined event or sub-event is detected, event recognizer **180** activates an event handler **190** associated with the detection of the event or sub-event. Event handler **190** optionally utilizes or calls data updater **176** or object updater **177** to update the application internal state **192**. In some embodiments, event handler **190** accesses a respective GUI updater **178** to update what is displayed by the application. Similarly, it would be clear to a person having ordinary skill in the art how other processes can be implemented based on the components depicted in FIGS. **1**A-**1**B.

[0573] Switching between Text and Video Communications

[0574] FIGS. **46**A-**46**C illustrate a flow chart illustrating a method **4600** for communicating between users, in accordance with some embodiments. FIGS. **47**A-**47**L, which illustrates exemplary user interfaces for communicating between users, are used to illustrate the processes in FIGS. **46**A-**46**C. The method **4600** is performed at a portable multifunction device (e.g., the device **100** in FIG. **1**A) with a touch-sensitive display (e.g., the touch screen **112** in FIG. **1**A). As described below, the method **4600** provides an efficient mechanism for seamlessly switching between communication modalities at a portable multifunction device. This method is faster and easier to perform than conventional methods of switching between modalities, which require users to exit one communication application and invoke another. The method is also intuitive for users, thereby reducing the cognitive burden on the user when selecting content, and creating a more efficient human-machine interface. A more efficient input mechanism also requires less computing resources, thereby increasing battery life of the device.

[0575] Referring now to FIG. **46**A, the device **100** displays (**4602**) a user interface of an instant messenger application on the display. For example, in FIG. **47**A, the instant messenger application includes a display area **4702** and an input area **4704**. The display area **4702** includes one or more instant messages (e.g., instant message **4703-1**) communicated between the device **100** and another device. The input area **4704** includes a keyboard **4706** to receive a sequence of characters. The input area **4704** also includes a send button **4707** that transmits an instant message upon selection by a user.

[0576] Referring back to FIG. **46**A, the device **100** constantly analyzes (**4604**) an instant message displayed in the user interface of the instant messenger application to identify a user's intention to perform an action associated with an application different from the instant messenger application. For example, as shown in FIG. **47**B, the device **100** analyzes newly-displayed instant message **4703-2** and determines that the user intends to initiate a video chat with the other user using a video conferencing application (e.g., because the content in the instant message **4703-2** includes the term "FaceTime").

[0577] In some embodiments, the application is (**4606**) a video conferencing application (e.g., as shown in FIG. **47**D), a peer-to-peer payment application, an email application, or a display sharing application. In some embodiments, the action causes the device **100** to launch the application on the device **100** and connect to the other user via the application.

[0578] In some embodiments, the user's intention to (**4608**) perform the action associated with another application different from the instant messenger application is identified by: analyzing terms contained in the instant message (e.g., analyzing the text entered by the user of the device **100** or the user of the other device); and determining the existence of a term associated with the new application from the term. For example, as shown in FIG. **47**B, the device **100** identifies the term "FaceTime" in message **4703-2** and determines that the term is associated with a video conferencing application.

[0579] Referring back to FIG. **46**A, upon determining an intention to perform the action, the device **100** displays (**4610**) an affordance to perform the action in the user interface of the instant messenger application. For example, as shown in FIG. **47**B, the device **100** displays a video conferencing application button **4708** entitled "FaceTime" as an affordance. If the video conferencing application button **4708** is selected by the user, the device **100** will launch a video conferencing application and connect to the other user via the video conferencing application, without the need for the user to first exit the instant messaging application and navigate to the other application.

[0580] In some embodiments, the affordance is (**4612**) displayed in a quick reply area of the user interface of the instant messenger application. For example, as shown in FIG. **47**B, video conferencing application button **4708** is displayed in quick reply area **4705** of the input area **4704**. Generally, in the quick reply area **4705**, the device **100** displays one or more user-selectable autocomplete words based on user selection of letters via keyboard **4706**. A user may then select one of the words in the quick reply area **4705** to enter text in the instant message.

[0581] Referring back to FIG. **46**A, while displaying the affordance in the user interface of the instant messenger application, the device **100** detects (**4614**) a user input on the affordance in the user interface of the instant messenger application. In some embodiments, the user input is (**4616**) a tap on the affordance. For example, as shown in FIG. **47**B, the device **100** detects a tap gesture **4710** at video conferencing application button **4708**.

[0582] Referring back to FIG. **46**A, in response to detecting the user input, the device facilitates (**4618**) the action. For example, as shown in FIGS. **47**B-**47**C, upon detection of tap gesture **4710** at video conferencing application button **4708** in FIG. **47**B, the device **100** launches a video conferencing application and connects to the other user, as shown in FIG. **47**C.

[0583] Turning now to FIG. **46**B, in some embodiments, the affordance is (**4620**) displayed within an input area of the user interface (e.g., video conferencing application button **4708** in input area **4704** as shown in FIG. **47**B) and facilitating the action includes: ceasing to display the instant messaging input area; fading-out the user interface of the instant messenger application (where the user interface includes a plurality of instant messages including the instant message); and fading-in a user interface of the application different from the instant messenger. For example, as shown in the sequence of FIGS. **47**B-**47**D, upon detection of tap gesture **4710** at video conferencing application button **4708** shown in FIG. **47**B, and while device **100** launches a video conferencing application and connects to the other user, the device **100** transitions from displaying the instant messaging application, as shown in FIG. **47**B, to displaying the video conferencing application, shown in FIG. **47**D. While transitioning, the device **100** ceases to display the input area **4704**, fades-out the instant messaging application and fades-in the video conferencing application, as shown in FIG. **47**C.

[0584] Referring back to FIG. **46**B, in some embodiments, facilitating the action includes (**4622**) activating and executing the application within the instant messenger application. For example, in FIGS. **47**C-**47**E and **47**H-**47**K, the FaceTime application is activated by the instant messenger application in response to the user selection of the FaceTime affordance **4708** (FIG. **47**B) and executed such that the FaceTime application interface is displayed within the instant messenger application interface.

[0585] Referring back to FIG. **46**B, in some embodiments, the application is (**4624**) a video conferencing application, and the action is to execute the video conferencing application (to record frames of a video conferencing and provide a video conferencing user interface to display the frames). Facilitating the action further comprises, upon completion of executing the video conferencing application (e.g., the user hangs-up the video call), fading-out the video conferencing user interface, and fading-in the user interface of the instant messenger application. In some embodiments, a visual history of the video conference may be inserted into the instant messaging user interface, e.g., key frames recorded during the video conference. For example, as shown in the sequence of FIGS. **47**D-**47**F, after the device **100** launches a video conferencing application and connects to the other user, and upon completion of the video conference, the device **100** fades-out the video conferencing application and fades-in the instant messenger application.

[0586] In some embodiments, after the device fades-in the instant messenger application interface, a visual history of the video conferencing session including key frames captured during the conferencing session can be inserted into the messenger application interface. For example, in FIG. **47**L, when the messenger application interface is back on display, key frames captured during the conferencing session are inserted into the messages to provide a visual history of the video conferencing.

[0587] Referring back to FIG. **46**B, in some embodiments, the completion of executing the video conferencing application is (**4626**) determined in response to detecting a second user input on the video conferencing user interface displayed within the user interface of the instant messenger application. For example, as shown in the sequence of FIGS. **47**D-**47**F, while the device **100** displays the video conferencing application as shown in FIG. **47**D, the device **100** detects a tap gesture **4712**. In response, the device **100** completes executing the video conferencing application and displays the instant messenger application as shown in FIG. **47**F.

[0588] Turning now to FIG. **46**C, in some embodiments, the user interface of the instant messenger application includes (**4628**) an input area containing the affordance and a virtual keyboard, and an output area displaying the instant messages. For example, as shown in FIG. **47**G, the device **100** displays a user interface of the instant messenger application including an input area **4704** including video conferencing application button **4708** and a virtual keyboard **4706**. The user interface of the instant messenger application also includes an output area **4702** displaying instant messages (e.g., messages **4703-1**, **4703-2**). In some embodiments, the user input is a swipe with an initial contact inside the output area followed by a movement in a direction across the touch-sensitive display; and facilitating the action includes: fading-in an application user interface of the application into the touch-sensitive display in accordance with the direction of the movement; and sliding the user interface out of the touch-sensitive display in accordance with the direction of the movement until the affordance and the virtual keyboard are shifted out of the touch-sensitive display, wherein: the input area and the output area of the user interface are superimposed on the application user interface, and the instant messages are displayed semitransparent over the application user interface. For example, as shown in FIGS. **47**G-**47**I, in response to detecting a downward swipe gesture **4714** in output area **4702**, as shown in FIG. **47**G, the device **100** fades-in the video conferencing application and slides the keyboard **4706** in a downward direction, as shown in FIG. **47**H. In FIG. **47**I, in some embodiments, the display area of the instant messenger application becomes semi-transparent, and the display area including the message bubbles are superimposed on the video conferencing interface, such that the user can view the messages and the video at the same time. In some embodiments, the message bubbles in the display area of the instant messenger application have a different opacity level (e.g., less transparent) from other regions of the display area so that the content of the messages can be viewed clearly on top of the video. In some embodiments, the input area is displayed below the display area of the instant messenger application so that the user can continue to input messages while the video is playing behind the messages.

[0589] Referring back to FIG. **46**C, in some embodiments, the device **100** receives (**4630**) a second user input over the application user interface in a region not on the instant

messages; and in response to detecting the second user input, the device ceases to display the user interface of the instant messenger application and maintains the display of the application user interface of the application. For example, as shown in FIG. **47**J, in response to detecting a tap gesture **4715** on the video, but not within an output area **4702** that includes instant messages, e.g., not on messages **4703-1**, **4703-2**, the device **100** ceases displaying the user interface of the instant messenger application and maintains display of the video conferencing user interface. By dismissing the instant messenger application interface, the user can better see the video conference.

[0590] In some embodiments, prior to determining the user's intention to perform the action, the device invokes (**4632**) the application in the background such that in response to detecting the user input on the affordance, the application user interface can be displayed within the instant messenger application user interface almost instantaneously, e.g., applications such as FaceTime® can be connected ahead of time in the background and the video can be displayed almost instantaneously within the instant messenger application user interface.

[0591] It should be understood that the particular order in which the operations in FIGS. **46**A-**46**C have been described is merely exemplary and is not intended to indicate that the described order is the only order in which the operations could be performed. One of ordinary skill in the art would recognize various ways to reorder the operations described herein. For brevity, these details are not repeated here.

[0592] In accordance with some embodiments, FIG. **48** shows a functional block diagram of an electronic device **4800** configured in accordance with the principles of the various described embodiments. The functional blocks of the device are, optionally, implemented by hardware, software, or a combination of hardware and software to carry out the principles of the various described embodiments. It is understood by persons of skill in the art that the functional blocks described in FIG. **48** are, optionally, combined or separated into sub-blocks to implement the principles of the various described embodiments. Therefore, the description herein optionally supports any possible combination or separation or further definition of the functional blocks described herein.

[0593] As shown in FIG. **48**, an electronic device **4800** includes a touch-sensitive display unit **4802** configured to receive user inputs and display user interfaces and a processing unit **4808** coupled to the touch-sensitive display unit **4802**. In some embodiments, the processing unit **4808** includes a display enabling unit **4810**, an analyzing unit **4812**, a detecting unit **4814**, a facilitating unit **4816**, a receiving unit **4818**, and an invoking unit **4820**.

[0594] In some embodiments, the processing unit **4808** is configured to display a user interface of an instant messenger application on the display unit **4802** (e.g., with the display enabling unit **4810**). The processing unit **4808** is further configured to analyze an instant message displayed in the user interface of the instant messenger application to identify a user's intention to perform an action associated with an application different from the instant messenger application (e.g., with the analyzing unit **4812**). Upon determining an intention to perform the action, the processing unit **4808** is configured to display an affordance to perform the action in the user interface of the instant messenger application (e.g., with the display enabling unit **4810**). While displaying the affordance in the user interface of the instant messenger application, the processing unit **4808** is configured to detect a user input on the affordance in the user interface of the instant messenger application (e.g., with the detecting unit **4814**); and in response to detecting the user input, the processing unit **4808** is configured to facilitate the action (e.g., with the facilitating unit **4816**).

[0595] In some embodiments, the application is a video conferencing application, a peer-to-peer payment application, email application, or display sharing application. In some embodiments, the user's intention to perform the action associated with the application different from the instant messenger application is identified by analyzing terms contained in the instant message; and determining existence of a term associated with the application in the terms. In some embodiments, the affordance is displayed in a quick reply area of the user interface of the instant messenger application. In some embodiments, the user input is a tap on the affordance. In some embodiments, the affordance is displayed within an input area of the user interface; and facilitating the action includes ceasing to display the input area; fading out the user interface of the instant messenger application, the user interface including a plurality of instant messages including the instant message; and fading in a user interface of the application different from the instant messenger. In some embodiments, facilitating the action includes activating and executing the application within the instant messenger application.

[0596] In some embodiments, the application is a video conferencing application; the action is to execute the video conferencing application to record frames of a video conferencing and provide a video conferencing user interface to display the frames; and facilitating the action further comprises, upon completion of executing the video conferencing application: (a) fading out the video conferencing user interface; (b) fading in the user interface of the instant messenger application; and (c) inserting a visual history of the video conferencing into the user interface including key frames from the frames.

[0597] In some embodiments, the completion of executing the video conferencing application is determined in response to detecting a second user input on the video conferencing user interface displayed within the user interface of the instant messenger application.

[0598] In some embodiments, the user interface of the instant messenger application includes an input area containing the affordance and a virtual keyboard, and an output area displaying the instant messages; the user input is a swipe with an initial contact inside the output area followed a movement in a direction across the touch-sensitive display unit **4802**; and facilitating the action includes: (a) fading in an application user interface of the application into the touch-sensitive display unit **4802** in accordance with the direction of the movement; and (b) sliding the user interface out of the touch-sensitive display unit **4802** in accordance with the direction of the movement until the affordance and the virtual keyboard are shifted out of the touch-sensitive display unit **4802**, wherein the input area and the output area of the user interface are superimposed on the application user interface, and the instant messages are displayed semi-transparent over the application user interface.

[0599] In some embodiments, the processing unit **4808** is configured to receive a second user input over the application user interface in a region not on the instant messages

(e.g., with the receiving unit **4818**); and in response to detecting the second user input, the processing unit **4808** is configured to cease to display the user interface of the instant messenger application and maintain the display of the application user interface of the application (e.g., with the display enabling unit **4810**).

[0600] In some embodiments, the processing unit **4808** is configured to, prior to upon determining the user's intention to perform the action, invoke the application in the background (e.g., with the invoking unit **4820**).

[0601] The operations in the information processing methods described above are, optionally implemented by running one or more functional modules in information processing apparatus such as general purpose processors (e.g., as described above with respect to FIGS. **1**A and **3**A-**3**B) or application specific chips.

[0602] The operations described above with reference to FIGS. **47**A-**47**L are, optionally, implemented by components depicted in FIGS. **1**A-**1**B or FIG. **48**. For example, display enabling operation **4810**, analyzing operation **4812**, detecting operation **4814**, facilitating operation **4816**, receiving operation **4818**, and invoking operation **4820** are, optionally, implemented by event sorter **170**, event recognizer **180**, and event handler **190**. Event monitor **171** in event sorter **170** detects a contact on touch-sensitive display **112**, and event dispatcher module **174** delivers the event information to application **136-1**. A respective event recognizer **180** of application **136-1** compares the event information to respective event definitions **186**, and determines whether a first contact at a first location on the touch-sensitive surface corresponds to a predefined event or sub-event, such as selection of an object on a user interface. When a respective predefined event or sub-event is detected, event recognizer **180** activates an event handler **190** associated with the detection of the event or sub-event. Event handler **190** optionally utilizes or calls data updater **176** or object updater **177** to update the application internal state **192**. In some embodiments, event handler **190** accesses a respective GUI updater **178** to update what is displayed by the application. Similarly, it would be clear to a person having ordinary skill in the art how other processes can be implemented based on the components depicted in FIGS. **1**A-**1**B.

[0603] Mirrored Control in Instant Messages

[0604] FIGS. **49**A-**49**C are flow charts illustrating a method **4900** for mirrored control between devices, in accordance with some embodiments. FIGS. **50**A-**50**L, which illustrate exemplary user interfaces for mirrored control, are used to illustrate the processes in FIGS. **49**A-**49**C. The method **4900** is performed at a first electronic device (e.g., the device **100** in FIG. **1**A and/or the device **100-2** in FIG. **50**A) with a touch-sensitive display (e.g., the touch screen **112** in FIG. **1**A or the touch screen **112-2** in FIG. **50**A). As described below, the method **4900** provides an efficient mechanism for seamlessly controlling multiple devices using a single user input. This method is faster and easier to perform than conventional methods, which require a user to switch from an instant messenger application to a screen sharing application to share and control images and videos displayed on another device. The method is also intuitive for users, thereby reducing the cognitive burden on the user when selecting content, and creating a more efficient human-machine interface. A more efficient input mechanism also requires less computing resources, thereby increasing battery life of the device.

[0605] Referring now to FIG. **49**A, the device **100** (e.g., the first electronic device) sends (**4902**) an item from a first instant messenger application running on the first electronic device (e.g., device **100**, FIG. **50**A) to a second instant messenger application running on a second electronic device (e.g., device **100-2**, FIG. **50**A). In some embodiments, the item is (**4904**) an image (e.g., a photo **5004** from the photo library in FIG. **50**A). In some embodiments, the item is (**4906**) a gift message (e.g., gift message **5010** in FIG. **50**F).

[0606] The device **100** displays (**4908**) the item in the first instant messenger application, wherein the item is concurrently displayed in the second instant messenger application. For example, in FIG. **50**B, each device **100** and **100-2** displays image **5004**, which was previously transmitted from device **100** to device **100-2** in response to a user selection **5006** of the image from the input area on device **100** (e.g., as shown in FIG. **50**A). In another example, in FIG. **50**F, each device **100** and **100-2** displays a gift message **5010**, which was previously transmitted from device **100** to device **100-2** in response to a user selection **5012** of the gift message in the input area. The device **100** receives (**4910**) information corresponding to an interaction with the item. In response to receiving information corresponding to the interaction, the device updates (**4912**) the item on the first electronic device, wherein the update to the item is mirrored on the second electronic device.

[0607] Referring back to the method **4900**, in FIG. **49**B, in some embodiments, the interaction is (**4914**) a swipe in a first direction on the item, and updating the item includes scrolling the item in the first direction. For example, FIGS. **50**A-**50**D illustrate a sequence of exemplary user interfaces for mirrored control of image **5004**. FIG. **50**A illustrates an exemplary user interface showing a first instant messenger application on device **100** and a second instant messenger application on device **100-2** before an item is sent. In this example, the instant messenger applications display messages **5002** and **5003** previously communicated between device **100** and device **100-2**. The first instant messenger application of the device **100** also displays an image **5004**, depicting a series of faces, in an input area. In response to a tap gesture **5006**, the device **100** sends the image **5004** to the device **100-2**. As shown in FIG. **50**B, after the image **5004** is sent, the devices **100** and **100-2** concurrently display a left-most partial view of the image **5004** in the output areas of their respective instant messenger applications. In FIG. **50**C, while the devices **100** and **100-2** concurrently display a partial view of the left-most portion of the image **5004** in the output areas of the respective instant messenger applications, the device **100** receives a leftward swipe gesture **5008** at the image **5004**. In response, as shown in FIG. **50**D, the device **100** scrolls the partial view of the image **5004** to the left in the user interfaces of both device **100** and **100-2** to display the right-most portion of the image **5004**.

[0608] Referring back to the method **4900**, in FIG. **49**B, in some embodiments, the device **100** receives (**4916**) a second item from the second instant messenger application to the first instant messenger application; displays the second item in the first instant messenger application, wherein the second item is concurrently displayed in the second instant messenger application; receives information corresponding to a second interaction with the second item; and while updating

the item on the first electronic device in response to receiving information corresponding to the interaction with the item, wherein the update to the item is mirrored on the second electronic device: in response to receiving information corresponding to the second interaction with the second item, concurrently updates the second item on the first electronic device, wherein the update to the second item is mirrored on the second electronic device. In some embodiments, the second interaction is (**4918**) a second swipe on the second item in a second direction, different from the first direction; and updating the second item includes scrolling the second item in the second direction.

[0609] For example, FIGS. **50**I-**50**L illustrate a sequence of exemplary user interfaces showing additional functionality for mirrored control of content. FIG. **50**I illustrates an exemplary user interface showing an instant messenger application on the devices **100** and **100-2**, subsequent to FIG. **50**D, before a new item is sent. In FIG. **50**I, the devices **100** and **100-2** display the right-most partial view of image **5004** previously communicated between device **100** and device **100-2**. The instant messenger application of device **100-2** also displays an image **5016** depicting a series of faces in an input area. In response to a tap gesture **5018**, the device **100-2** sends the image **5016** to the device **100**. As shown in FIG. **50**J, after the image **5016** is sent, the devices **100** and **100-2** concurrently display a left-most partial view of image **5016** in the output areas of their respective instant messenger applications, in addition to the right-most partial view of image **5004**. In FIG. **50**K, while the devices **100** and **100-2** concurrently display a partial view of the right-most portion of the image **5004** and the left-most portion of the image **5016** in the output areas of the instant messenger applications, the device **100** receives a leftward swipe gesture **5018** at the image **5016** and the device **100-2** receives a rightward swipe gesture **5020** at the image **5004**. In response, as shown in FIG. **50**L, the device **100** scrolls the partial view of the image **5016** to the right in the user interfaces of both device **100** and **100-2** to display the right-most portion of the image **5016**. In addition, the device **100-2** scrolls the partial view of the image **5004** to the left in the user interfaces of both device **100** and **100-2** to display the left-most portion of the image **5004**. As indicated by the dotted line in FIG. **50**L, in some embodiments, devices **100** and **100-2** concurrently scroll the images **5004** and **5016** but in opposite directions, one is to the left and the other is to the right.

[0610] Referring back to the method **4900**, in FIG. **49**B, in some embodiments, the interaction is (**4920**) a contact on the item displayed in the second instant messenger application for a duration longer than a predetermined threshold; and updating the item includes unwrapping the item (e.g., press-and-hold gesture **5014** and gift unwrapping animation of gift image **5010** as shown in FIG. **50**G). In some embodiments, prior to the unwrapping, the item includes (**4922**) obscured content (e.g., dimmed or blurred); and unwrapping the gift message includes: displaying an animation of the unwrapping (e.g., ribbon unwrapping or box opening); and fading in the obscured content (e.g., smiley face image obscured by gift image **5010** in FIG. **50**G). In some embodiments, the unwrapping is (**4924**) mirrored on the first device and the second device, and the mirroring on the first device includes concurrently displaying the unwrapping in the first instant messenger application and displaying the unwrapping in an input area of the first instant messenger application (e.g., gift unwrapping animation of gift image **5010** as shown in FIG. **50**G).

[0611] For example, FIGS. **50**E-**50**H illustrate exemplary user interfaces for mirrored control of content utilizing gift message functionality. Specifically, FIG. **50**E illustrates user interfaces for devices **100** and **102-2** where a gift image **5010** is displayed in an input area of the user interface of device **100**. As shown in FIG. **50**F, in response to a tap gesture **5012**, the device **100** inserts the gift image **5010** in the messages area of the display and sends the gift image **5010** to the device **100-2** for concurrent display. While displaying the gift image **5010**, the device **100** also displays an obscured smiley face image, behind the gift image **5010**, which will be fully displayed once the gift is "opened" by the user of device **100-2**. In FIG. **50**G, the device **100-2** detects a press-and-hold gesture **5014** (and in some embodiments, sends information corresponding to the press-and-hold gesture to device **100**). In response, the devices **100** and **100-2** display a gift unwrapping animation while fading in the obscured smiley face. In FIG. **50**H, the devices **100** and **100-2** display the smiley face image **5015**.

[0612] Referring back to method **4900**, in FIG. **49**C, in some embodiments, the interaction is (**4926**) a tap on an affordance representing the item in an input area of the first instant messenger application; and the item is sent immediately in response to detecting the interaction. In some embodiments, the interaction is (**4928**) a press-and-hold or a deep press on an affordance representing the item displayed in an input area of the first instant messenger application; and the item is sent after a predetermined amount of time in response to detecting the interaction. In some embodiments, the predetermined amount of time is (**4930**) selectable by a user (e.g., with a slider). For example, in response to the tap gesture **5012** in FIG. **50**F, the device **100** sends the gift **5010** to device **100-2** immediately. Though not shown in the figures, in response to a press-and-hold or deep press on the gift message in the input area, the device can delay the gift sending. The delay is configurable by the user.

[0613] In some embodiments, prior to receiving information corresponding to the interaction: the device receives (**4932**) information corresponding to a contact on the item displayed in the first instant messenger application or the second instant messenger application for a duration longer than a predetermined threshold (e.g., before the leftward swipe **5008** in FIG. **50**C, a press-and-hold gesture at image **5004** may be detected). In response to detecting the contact for the duration longer than the predetermined threshold, the device **100** activates a mirrored control mode. In some embodiments, the activation of the mirrored control mode is indicated by displaying an animation of the image in the instant messenger application, e.g., blinking, enlarging followed by shrinking etc.

[0614] It should be understood that the particular order in which the operations in FIGS. **49**A-**49**C have been described is merely exemplary and is not intended to indicate that the described order is the only order in which the operations could be performed. One of ordinary skill in the art would recognize various ways to reorder the operations described herein. For brevity, these details are not repeated here.

[0615] In accordance with some embodiments, FIG. **51** shows a functional block diagram of an electronic device **5100** configured in accordance with the principles of the various described embodiments. The functional blocks of

the device are, optionally, implemented by hardware, software, or a combination of hardware and software to carry out the principles of the various described embodiments. It is understood by persons of skill in the art that the functional blocks described in FIG. **51** are, optionally, combined or separated into sub-blocks to implement the principles of the various described embodiments. Therefore, the description herein optionally supports any possible combination or separation or further definition of the functional blocks described herein.

[0616] As shown in FIG. **51**, a first electronic device **5100** includes a touch-sensitive display unit **5102** configured to receive user inputs and display user interfaces and a processing unit **5108** coupled to the touch-sensitive display unit **5102**. In some embodiments, the processing unit **5108** includes a sending unit **5110**, a display enabling unit **5112**, a receiving unit **5114**, an updating unit **5116**, and an activating unit **5118**.

[0617] In some embodiments, the processing unit **5108** is configured to send an item from a first instant messenger application running on the first electronic device to a second instant messenger application running on a second electronic device (e.g., with the sending unit **5110**). The processing unit **5108** is further configured to display the item in the first instant messenger application (e.g., with the display enabling unit **5112**), where the item is concurrently displayed in the second instant messenger application. The processing unit **5108** is further configured to receive information corresponding to an interaction with the item (e.g., with the receiving unit **5114**), and in response to receiving information corresponding to the interaction, update the item on the first electronic device (e.g., with the updating unit **5116**), where the update to the item is mirrored on the second electronic device.

[0618] In some embodiments, the item is an image. In some embodiments, the item is a gift message. In some embodiments, the interaction is a swipe in a first direction on the item, and updating the item includes scrolling the item in the first direction. In some embodiments, the interaction is a contact on the item displayed in the second instant messenger application for a duration longer than a predetermined threshold; and updating the item includes unwrapping the item. In some embodiments, prior to the unwrapping, the item includes obscured content, and unwrapping the item includes enabling the display of an animation of the unwrapping and fading in the obscured content. In some embodiments, the unwrapping is mirrored on the first device and the second device, and the mirroring on the first device includes concurrently enabling display of the unwrapping in the first instant messenger application and enabling display of the unwrapping in an input area of the first instant messenger application.

[0619] In some embodiments, the processing unit **5108** is configured to receive a second item from the second instant messenger application to the first instant messenger application (e.g., with the receiving unit **5114**). The processing unit **5108** is configured to display the second item in the first instant messenger application (e.g., with the display enabling unit **5112**). The second item is concurrently displayed in the second instant messenger application. Information corresponding to a second interaction with the second item (e.g., with the receiving unit **5114**) is then received, and while updating the item on the first electronic device and in response to receiving information corresponding to the interaction with the item, where the update to the item is mirrored on the second electronic device, in response to receiving information corresponding to the second interaction with the second item, the processing unit **5108** is configured to concurrently update the second item on the first electronic device (e.g., with the updating unit **5116**), where the update to the second item is mirrored on the second electronic device.

[0620] In some embodiments, the second interaction is a second swipe on the second item in a second direction, different from the first direction; and updating the second item includes scrolling the second item in the second direction. In some embodiments, the interaction is a tap on an affordance representing the item in an input area of the first instant messenger application; and the item is sent immediately in response to detecting the interaction. In some embodiments, the interaction is a press-and-hold or a deep press on an affordance representing the item displayed in an input area of the first instant messenger application; and the item is sent after a predetermined amount of time in response to detecting the interaction. In some embodiments, the predetermined amount of time is selectable by a user.

[0621] In some embodiments, the processing unit **5108** is configured to, prior to receiving information corresponding to the interaction, receive information corresponding to a contact on the item displayed in the first instant messenger application or the second instant messenger application for a duration longer than a predetermined threshold (e.g., with the receiving unit **5114**). In response to detecting the contact for the duration longer than the predetermined threshold, the processing unit is configured to activate a mirrored control mode (e.g., with the activating unit **5118**).

[0622] The operations in the information processing methods described above are, optionally implemented by running one or more functional modules in information processing apparatus such as general purpose processors (e.g., as described above with respect to FIGS. **1**A and **3**A-**3**B) or application specific chips.

[0623] The operations described above with reference to FIGS. **50**A-**50**L are, optionally, implemented by components depicted in FIGS. **1**A-**1**B or FIG. **51**. For example, sending operation **5110**, display enabling operation **5112**, receiving operation **5114**, updating operation **5116**, and activating operation **5118** are, optionally, implemented by event sorter **170**, event recognizer **180**, and event handler **190**. Event monitor **171** in event sorter **170** detects a contact on touch-sensitive display **112**, and event dispatcher module **174** delivers the event information to application **136-1**. A respective event recognizer **180** of application **136-1** compares the event information to respective event definitions **186**, and determines whether a first contact at a first location on the touch-sensitive surface corresponds to a predefined event or sub-event, such as selection of an object on a user interface. When a respective predefined event or sub-event is detected, event recognizer **180** activates an event handler **190** associated with the detection of the event or sub-event. Event handler **190** optionally utilizes or calls data updater **176** or object updater **177** to update the application internal state **192**. In some embodiments, event handler **190** accesses a respective GUI updater **178** to update what is displayed by the application. Similarly, it would be clear to a person having ordinary skill in the art how other processes can be implemented based on the components depicted in FIGS. **1**A-**1**B.

[0624] The foregoing description, for purpose of explanation, has been described with reference to specific embodiments. However, the illustrative discussions above are not intended to be exhaustive or to limit the invention to the precise forms disclosed. Many modifications and variations are possible in view of the above teachings. The embodiments were chosen and described in order to best explain the principles of the invention and its practical applications, to thereby enable others skilled in the art to best use the invention and various described embodiments with various modifications as are suited to the particular use contemplated.

What is claimed is:

1. A method for communicating between users, comprising:

at an electronic device including, processor, memory, and a touch-sensitive display:

displaying a communication user interface, wherein the communication user interface is selected from a group consisting of a video-conferencing user interface, a messaging user interface, and a user interface that includes video-conferencing and messaging;

displaying communications between the electronic device and at least one other electronic device within the communication user interface;

receiving instructions to display video-conferencing content and messaging content between the electronic device and at least the one other electronic device in the communication user interface; and

in response to receiving the instructions, displaying the video-conferencing content and the messaging content between the electronic device and at least the one other electronic device in the communication user interface, wherein the messaging content overlays the video-conferencing content.

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